



URBAN CASE STUDIES: GUADALAJARA, MEXICO

Low Income Dwelling Surveys and a Site and Services Proposal

BY

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ABSTRACT

This study presents a comparison of different typical low-income housing systems in the city of Guadalajara, Mexico. It provides data to formulate, evaluate and implement housing policies especially in the physical planning aspects. At the end, a proposed outline for a site and services project is also presented.

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PROFESSOR OF ARCHITECTURE

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## CONTENTS

PREFACE	4
INTRODUCTION	5
Land Utilization Summary	8
Physical Data Matrix	11
Community Facilities, Utilities/Services Matrix	13
CONCLUSION	14
URBAN CONTEXT	16
CASE STUDIES	21
1. San Juan de Dios	22
2. Colonia Echeverria	30
3. Santa Cecilia	38
4. La Tuzania	44
PROPOSED PROJECT	51
Site Data	52
Basic Data, Cost Data	54
Planning Policies/Goals	56
Land Subdivision	58
Housing, Urban Segments/Clusters/Blocks	60
Dwelling Options	62
Comparison	64
APPENDIX	67
Dwelling Types	68
National Context	70
GLOSSARY	72
REFERENCES/EXPLANATORY NOTE	76

## PREFACE

**GOAL:** The main goal of this study is to identify, analyze, evaluate and compare the present physical structure of housing systems in Guadalajara City, in relation to social, economical and cultural conditions.

**APPLICATION/AUDIENCE:** It provides a framework to help make informed decisions and to clarify particular courses of action related to low-income housing policies. It is directed to those concerned with the problems of shaping the environment, especially in those areas of very rapid growth affecting the low-income sector of the population.

**DATA:** The data are derived from field surveys carried out by the author from 1974 to 1978, also from interviews and reports from public and private agencies. These data can be used as a practical reference through the comparison of housing policies with existing residential environments.

**MODEL:** The proposed project is intended to serve as an alternative physical model, focusing on basic physical issues of land subdivision, land utilization and land distribution. It incorporates in the design physical, socio-economical and cultural inputs of Guadalajara.

## INTRODUCTION

### BACKGROUND

Guadalajara after Mexico City, is the second largest city of the country. Although five times smaller than the capital, it disproportionally influences the large northwest part of the country, attracting numerous migrants from the impoverished adjoining rural areas. This migration pattern along with the natural population growth of the city, has given rise to a massive urbanization that is becoming more and more unmanageable.

As opposed to Mexico City or Monterrey (the third largest city in the country), Guadalajara is not an important industrial center, local industry supplies a minimum of the products sold in the region. However, it is a large and important commercial-trade center where marginal employment and unemployment tend to proliferate. These offer little opportunities for the development of stable forms of employment for the new low-income migrants, which consequent jeopardize the effort of the authorities to cope with the uncontrolled urbanization.

Moreover, the inherent problems of large underdeveloped cities are already acute: Transportation problems, traffic problems; pollution; shortage of urban facilities, scarcity and speculation with urban land, goods and products. In short, aggravation of the conditions of exploitation whose largest effect is upon the lowest income sectors of population which represent by far, the majority.

All these problems are particularly pronounced and critical when related to housing, because this activity consumes most of the available urban land, requires the costly provision of utility networks and services, and demands urban facilities to such extent that the rapid growth overburdens the scarce resources of the city.

Simultaneously, the conventional government approach to this crisis has been highly unadequate. Therefore new, practical and pragmatic insights must be assumed by the authorities, in order to recognize and encourage popular participation necessary to alleviate these problems.

In this study a classification of present housing systems is outlined, with the aim of investigating existing patterns and conditions of different settlements; to relate and compare basic issues about land utilization and efficiency of settlements patterns; and to recognize, define and evaluate the limitations/potentials and evolution of these systems in terms of their physical structure.

The following housing systems are identified:

1. SQUATTERS: Sparsely located in the periphery, they mostly house very-low income people with extremely marginal employment. They have been able to sustain the illegal land tenure and occupation situation due to: the low value of the land, the settling on unused rights-of-way, or the ignorance of the land owners about them. This system does not have an impact on the total spectrum of housing, because they only represent one percent of the total population; no signs of growth are apparent.

2. TENEMENTS ("VECINDADES"): Predominantly located in the city center and inner ring. The system is largely made of standard court tenements, with one-two room rental dwelling units with a shared laundry area, toilet/bathrooms. A new apartment type tenement - with two rooms, basic services and shared court - appeared in the early 60's on both the inner ring and the periph-

ery. The "vecindades" are the core housing system in the city; it serves very-low and low income recent migrants as well as very-low and low-income tenants that are attached to the city center for employment and opportunities. It accounts for approximately 17% of the population.

3. ILLEGAL SUBDIVISIONS: Located in the periphery, invariably on government land ("ejidos"), where the land has been illegally sold, and where the subdivision follows the basic former agricultural parcel pattern. Since 1970 this system is becoming the most important popular response to housing for the low income; three reasons may explain this phenomenon: 1- availability of large quantities of "ejidos" (approximately 10 km around the city center); 2- the private sector that has been incapable to compete with this "underground" supply; 3- the failure of the government to integrate these "ejidos" into the urban structure in order to be properly developed.

Today it accounts for about 16% of the population, but it is rapidly increasing.

#### 4. PRIVATE SPECULATIVE DEVELOPMENTS

("COLONIAS POPULARES"): Located in the inner ring and the periphery, mostly towards the eastern side of the city. From 1950 up to approximately 1970, the private sector was the most significant source of land for the low and moderate-low income. From 1970 on, this group has had less and less capacity to pay for this kind of development. Presently this system houses 35% of the total population, but its importance is declining. The old private speculative developments are today well consolidated communities.

5. **PUBLIC HOUSING:** Located in the inner ring and on the periphery. The first large scale projects were developed about 15 years ago. Although intended for lower income groups, these projects have never reached such levels. They house lower-middle to middle income groups. It is the only housing system that contemplates the provision of instantly developed "packages", including utilities/services, complete dwelling units, and community facilities. The last impulse given to these programs was the "INFONAVIT" plan that did not accomplish its original goals, not even in number of finished dwelling units. It accounts for only 6% of the population, but might increase in the future dependent on government action.

6. **OLD TRADITIONAL DEVELOPMENTS:** Located in the city center and inner ring. Two original predominant influences can be mentioned: the dwelling model was imported from Southern Spain, and the layout resulted from the regulations of the "Cedula Real" of Phillip the Second. This still accounts for 17% of the total population. Different socio-economical pressures are making this housing system obsolete. Today it houses middle to middle-high income people.

7. **HIGH INCOME AREAS:** Housing systems serving middle-high and high income groups were not considered in this study. They represent approximately 8% of the total population. For these groups housing needs are adequately solved by private, market means.

## CONTENTS

The work has been divided into three main sections:

1. **Introduction:** Overall information is placed at the beginning to provide a general view of the whole. A basic typological classification is presented in a land utilization summary. Twenty-one dwelling surveys complement this introduction with the purpose of correlating/comparing the trends and patterns of the spectrum of low-income housing. They are evaluated on two levels: Physical data (dwellings, etc.), and community facilities/utilities/services data. A brief conclusion is included at the end.
2. **Case studies:** Four representative case studies are presented; they are analyzed at four levels: The locality, selected segment, selected block and typical dwelling unit. A brief urban context precedes this section.
3. **Proposed project:** A proposed project incorporates the suggested policies of this study, and offers a different approach for the design of low-income housing areas.

Complementary information can be found in the appendix and a glossary.

**LAND UTILIZATION SUMMARY**

LOCALITIES  
DATE  
HOUSE TYPES  
INCOME

LOCALITY SEGMENT 400 x 400 MTS. 16 HECTARES

LOCALITY: Eight representative localities were selected in order to present a general cross section of urban/dwelling environments with their evolution in Guadalajara.

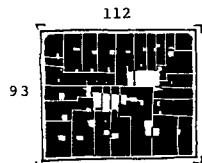
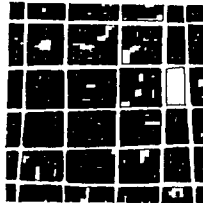
LOCALITY SEGMENT: For purposes of comparison, a typical segment of 400m by 400m is taken from each locality. The segment shows the subdivision pattern and the circulation layout.

**LOCALITY BLOCK LAND UTILIZATION DATA**

LOCALITY BLOCK: Within each locality segment a typical residential block is selected, with the aim of determining land utilization, circulation length and densities in relation to number of lots, dwellings and people.

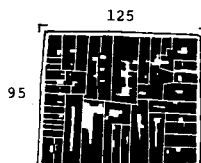
NUMBER OF LOTS  
AVERAGE LOT AREA  
DWELLING UNITS  
DWELLING UNITS/Ha (gross)

**1 CENTRO**  
Up to 1900  
Old traditional, Tenements  
Middle, Very low



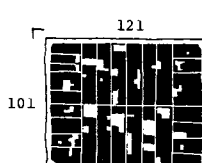
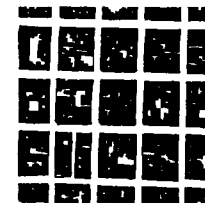
112  
93  
25  
340  
25  
24

**2 SAN JUAN DE DIOS**  
1920  
Tenements, Old traditional  
Very low, Low



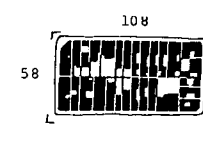
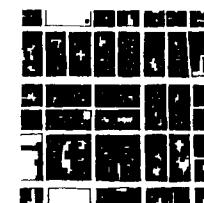
125  
95  
38  
260  
82  
84

**3 SAN JUAN BOSCO**  
1940  
Old private speculative, Tenements  
Mod. low, Low, Very low



121  
101  
28  
300  
39  
32

**4 COL. DEL FRESNO**  
1940-50  
Old Private speculative, Tenements  
Mod. Low, Low, Very low

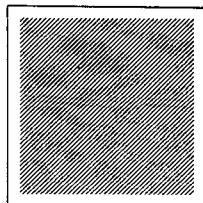


108  
58  
29  
160  
35  
56

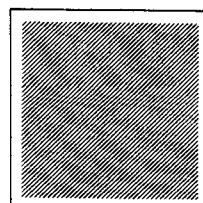
**LAND UTILIZATION DIAGRAMS 1 HECTARE**

LAND UTILIZATION PERCENTAGES: Proportions of public land and private areas are compared. Their ratio determines the users control, maintenance responsibility, and functional efficiency of a layout; i.e., a high percentage of public land results in high direct costs of installation and maintenance for the city's administration, as well as high indirect costs due to inefficient use of the land.

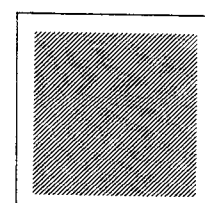
% OF PRIVATE LAND  
% OF PUBLIC LAND



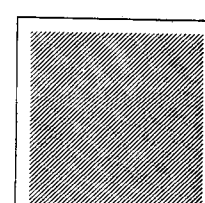
82  
18



82  
18



70  
30

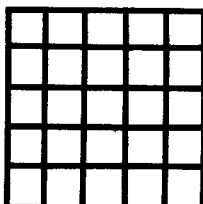


75  
25

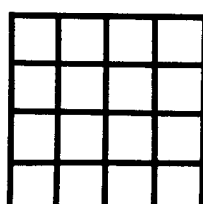
**NETWORK EFFICIENCY 400 x 400 MTS. 16 HECTARES**

CIRCULATION LENGTHS: A relation between public circulation length and area served indicates the network efficiency; a high ratio means a less efficient network in terms of direct costs and maintenance costs.

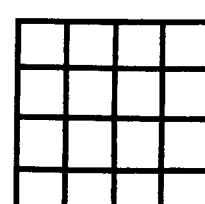
Mts/Ha



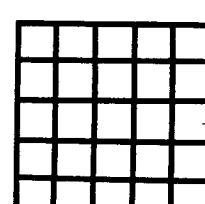
250



200



200



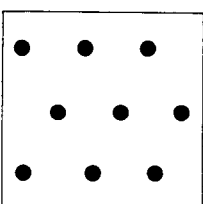
250

**NET DENSITY 1 HECTARE**

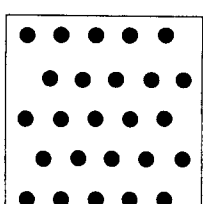
● 20 PERSONS

DENSITIES: The number of persons per hectare relates to both the number of lots and the type of dwellings per hectare. This determines the intensity of land use; low densities mean higher development costs per person.

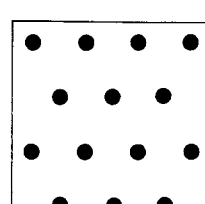
PERSONS/Ha



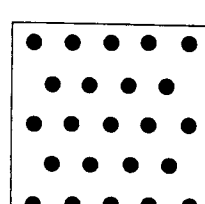
175



500



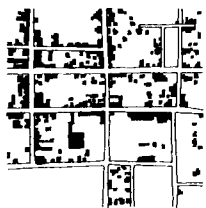
275



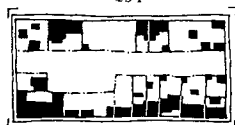
450

**5 TETLAN**

1900  
Old illegal subdivision  
Low

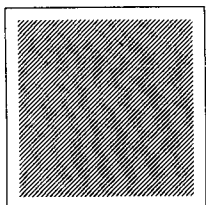


154

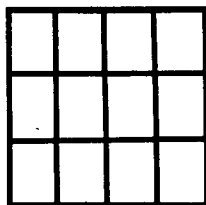


76

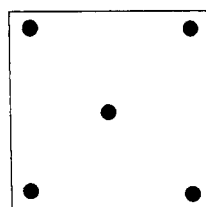
17  
558  
17  
15



81  
19



175



105

**6 COL. ECHEVERRIA**

1970  
New illegal subdivision  
Low

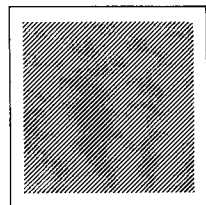


165

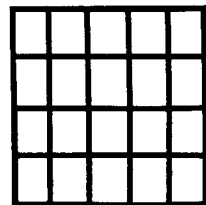


63

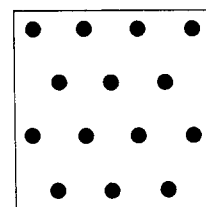
30  
266  
38  
37



77  
23



229



285

**7 SANTA CECILIA**

1960-70  
Private speculative  
Mod. low, Low

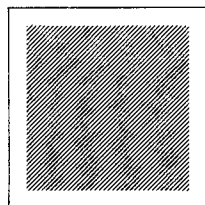


163

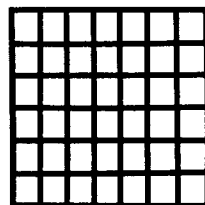


39

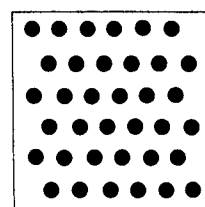
52  
85  
52  
80



67  
33



325



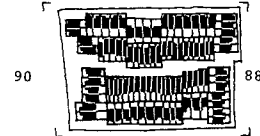
710

**8 LA TUZANIA**

1970  
Public housing  
Mod. low, Middle

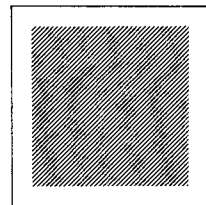


140

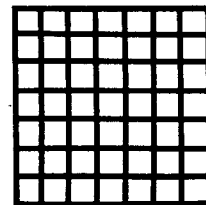


90

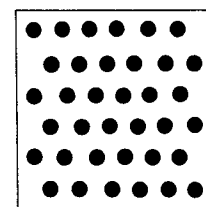
93  
85  
93  
75



63  
37

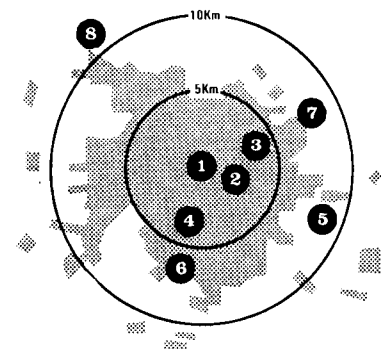


331



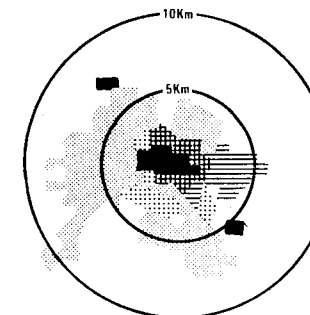
710

LOCATION KEY/COMPARATIVE URBAN AREAS



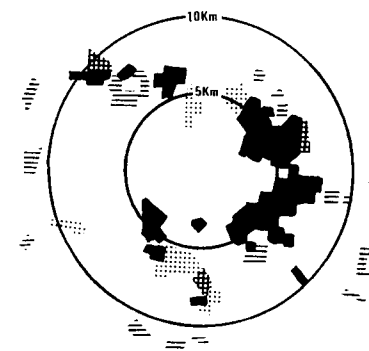
- |                    |                   |              |
|--------------------|-------------------|--------------|
| 1 CENTRO           | 5 TETLAN          | 8 LA TUZANIA |
| 2 SAN JUAN DE DIOS | 6 COL. ECHEVERRIA |              |
| 3 SAN JUAN BOSCO   | 7 SANTA CECILIA   |              |
| 4 COL. DEL FRESNO  |                   |              |

SIMILAR COMPARATIVE AREAS  
LOCALITIES 1,2,3,4.



High Income Areas

SIMILAR COMPARATIVE AREAS  
LOCALITIES 5,6,7,8.



**MATRIXES:** Data of the twenty-one dwelling surveys are summarized in both, the physical, and the community facilities, utilities and services matrixes. They permit:

- a) A comprehensive view of the spectrum of low income housing.
  - b) A determination and comparison of trends and patterns.
- On the left hand side are indicated: Housing systems with tentative population figures and percentages; surveyed locality names with tentative percentages of population living in similar physical conditions. They are related to the user's income group associated to the minimum official wage; in 1978 this was \$ 1600.00 per annum. The range varies from 1/4 to 2 times this figure.

The physical data matrix also indicates the time process of each housing systems showing: Construction period, useful period and obsolete period of every type.

Dwelling areas, lot areas, densities, and circulation lengths of the five-Main housing systems - (tenements, illegal subdivision, private speculative, public housing, and old traditional) - are plotted on the graphs.

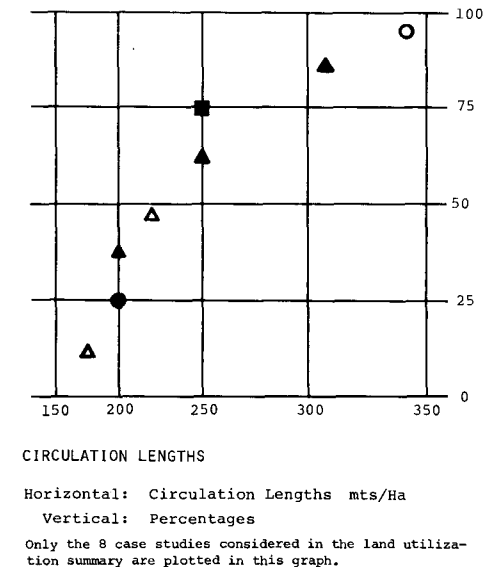
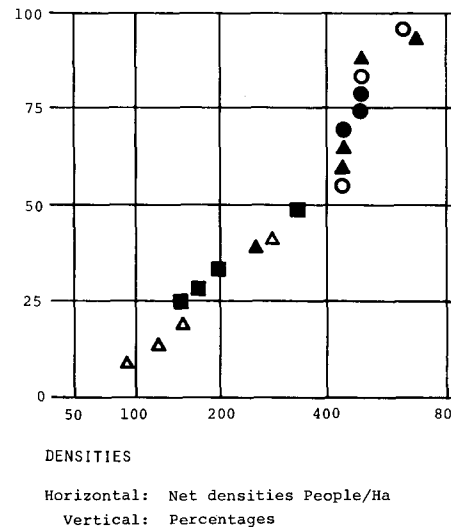
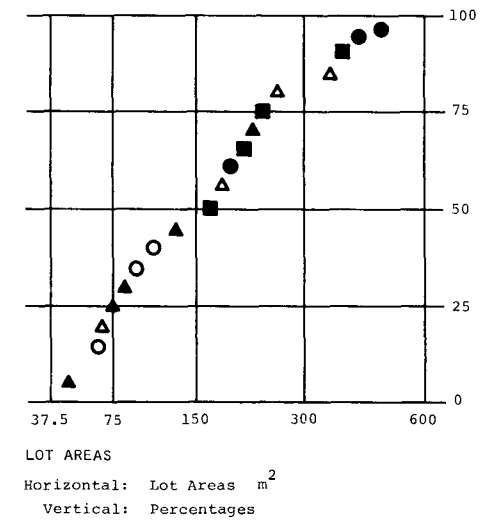
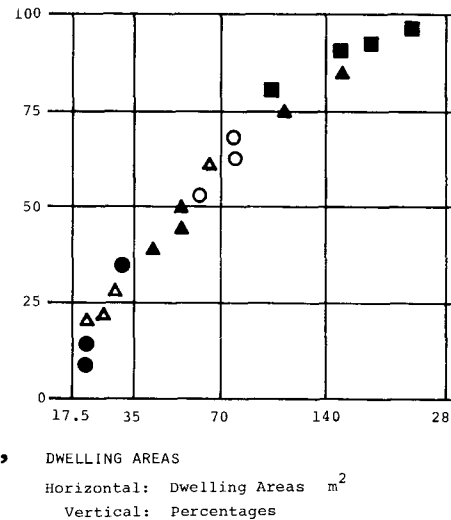
General pattern for each housing system is as follows:

**SQUATTERS:** Shanties with minimum dwelling unit areas. For very low income dwellers who own the shelter but not the land. No rent or mortgage payments. Located on the city periphery. They are semi-detached units in a bad physical state. Built incrementally through self-help from wasted materials. No community facilities, utilities and services are provided.

**TENEMENTS:** Minimum rooms for very-low income. Rental units on private court tenements. More than 20% of their income is paid for rent. Large lots with shared laundry/toilet/bathroom. Located in the city center or inner ring, where complete community facilities, utilities and services are provided. Generally in fair physical state. Incrementally built by accretion of rooms. Managed, maintained, and controlled by private landlords.

GRAPHS OF DWELLING AREAS, LOT AREAS, DENSITIES AND CIRCULATION LENGTHS OF DIFFERENT HOUSING SYSTEMS. VALUES TAKEN FROM PHYSICAL DATA MATRIX AND LAND UTILIZATION SUMMARY.

- KEY**
- TENEMENTS (VECINDADES)
  - △ PRIVATE SPECULATIVE (COLONIAS POPULARES)
  - ▲ ILLEGAL SUBDIVISION
  - PUBLIC HOUSING
  - OLD TRADITIONAL



PHYSICAL DATA MATRIX

HOUSING SYSTEMS	% of Total Population	LOCALITIES	% of Total Population	TIME PROCESS							USER		DWELLING UNIT				LAND/LOT			DWELLING					DWELLING DEVELOPMENT					
				 CONSTRUCTION PERIOD USEFUL PERIOD OBSOLETE PERIOD							Income	Type	Area	Tenure	Rent Mort	Utilization	Area	Tenure	Location	Type	No. Floors	Utilization	Phy. State	Mode	Developer	Builder	Materials	Net Den.		
				1900	1910	1920	1930	1940	1950	1960	1970	1980	Very Low Mod. Low Lower mid. Middle	Shanty Room House Apartment	50 m2 or less 51 - 100 m2 101 m2 or more	Legal Rental Legal Ownership	21% or more of inc 20% or less of inc	Semiprivate Private	m2	Extralegal: rental Extralegal: owners Legal: rental Legal: owners	City Center Inner Ring Periphery	Row/Grouped Walk-up Semi-detached	1 Two or more	Single Multiple	pad Fair Good	Incremental Instant	Popular Private Public	Self-Help Artisan/mason Small Contractor Large Contractor	Shack Adobe/Wood Masonry Other	People/ha
SQUATTERS 20,000	1	1. SQUATTERS	1											NA		-													75	1
TENEMENTS VECINDADES		2. CENTRO P. MORELOS	3													400													500	2
		3. SAN JUAN DE DIOS	10 *													480													500	3
	340,000	4. COL. DEL FRESNO (A)	4													190													450	4
ILLEGAL SUBDIVISION		5. LA PIRAMIDE	4													70													125	5
		6. DOMINGO SAVIO	2													175													150	6
		7. COL. ECHEVERRIA	6 *													250													285	7
	320,000	8. TETLAN	4											NA		360													105	8
PRIVATE SPECULATIVE COLONIAS POPULARES		9. COL. ESPERANZA	5													75													500	9
		10. COL. DEL FRESNO (B)	2													45													450	10
		11. SANTA CECILIA	12 *													75													710	11
		12. SANTA TERESITA (A)	10											NA		120													450	12
	700,000	13. SAN JUAN BOSCO	6											NA		200													275	13
PUBLIC HOUSING		14. LA TUZANIA	1 *											NA		64													710	14
		15. L. DE GUEVARA	1											NA		2300													500	15
	120,000	16. EL ALAMO	4											NA		110													450	16
OLD TRADITIONAL		17. SANTA TERESITA (B)	7											NA		165													350	17
		18. CAPILLA DE JESUS	5													195													200	18
		19. SANTUARIO	3											NA		225													175	19
	340,000	20. SAN FELIPE	2											NA		375													150	20
HIGH INCOME		21. HIGH INCOME	8											NA		-													-	21
	160,000																													
	2'000,000	100 TOTAL POPULATION																												

\* CASE STUDIES

**ILLEGAL SUBDIVISION:** Rooms on shared lots owned by low income dwellers on illegally bought land. More than 20% of their income is invested in housing construction. Incrementally built by aided self-help. Located on the periphery. No community facilities or utilities and services are available due to the illegal tenure. Public transportation is available. Electrical wires are sometimes connected to the city's network. Gas for cooking, distributed by private companies is available.

**PRIVATE SPECULATIVE:** Moderate-low income dwellers. Legal purchase of lots with defficient community facilities and utilities/services. Located on the city periphery, these lots are rapidly cover with aided self-help/artisan houses that to a certain extent meet the municipal housing regulations. They are financed by private speculative companies, paying more than 20% of their income in both installment payments and building expenses.

**PUBLIC HOUSING:** For lower-middle income people financially stable enough to apply to the government housing agencies, that offer an instant house, community facilities, utilities and services. Located on the periphery. Generally subsidized, the percentage of income they pay for the mortgages does not reflect the initial physical conditions of the environment.

**OLD TRADITIONAL:** Middle income to middle-high income. Located in the city center and inner ring. Privately owned large old houses. Fair physical state. Complete community facilities, utilities and services.



## CONCLUSION

It is inevitable that Guadalajara will continue to grow in the immediate future despite efforts intended to retard population inflow.

The population will double in approximately 12 years; by the year 2000 the city will contain almost six million people. 50% of that population will not be able to reach the formal housing market.

The rapid urbanization is having deteriorating effects on all aspects of life. In housing the most common pattern has become illegal subdivisions. In addition, the 4,300 hectares of government land, "ejido", surround the city acting as a counterweight to regulate private land prices. However, the slow bureaucratic procedures in the legal integration of these areas have negatively affected the urgent need to control land subdivision, land distribution, appropriate directions of growth, and to a large extent the assurance of future economical feasible provision of utilities and infrastructure.

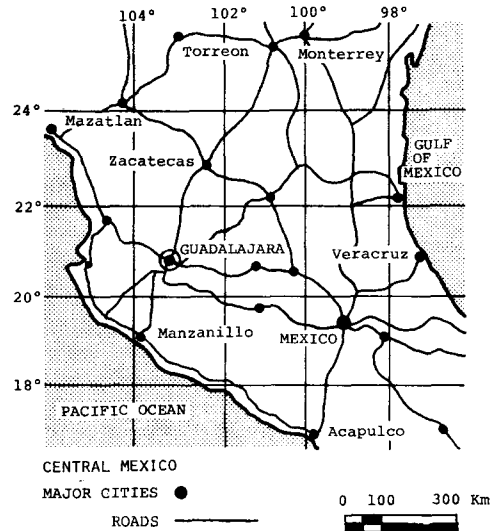
Although government policies have proven highly inefficient and limited, public and private intervention will still be required, and large scale developments must continue to be implemented; but the instant-public-projects-approach must change. Basic action should be taken in the provision of utilities/services and community facilities over which the government has direct control and responsibility.

The provision of dwellings by the popular sector must be encouraged and supported by the government; particular consideration should be given to the very low income informal sectors that have clearly shown their ability to finance and construct their own dwellings suited to their financial and social requirements.



## URBAN CONTEXT

### Guadalajara, Mexico



1. PRIMARY INFORMATION. Guadalajara, the capital of Jalisco State, is situated about 540 km. northwest of Mexico City. It is the second largest city of the country with two million people, representing 37% of the total state population. It is connected to all other parts of the country by an extensive highway, railway and air route network, and it plays an important role as regional center of economic interaction between the center and the northwest section of the country. The city is characterized by its mild climate resulting from its location in a relatively protected wide valley in the highlands.

2. HISTORY. When the Spaniards conquered Mexico during the years 1519 to 1521, the area contained an Indian people that were scattered in small villages and that cultural, linguistic and racially were ambiguous and distant from the greatest Mexican cultures of the central region.

Guadalajara was founded by the Spanish captain Juan de Onate and a small group of people in 1541. They chose the actual site after four frustrated attempts at other sites because the final site was in a strategical position concerning the Indians, it had adequate water, and had sufficient land for agriculture. The lack of human and natural resources; ie, Indian labor and minerals; and because of the location of the mining cities to the north, the city became a commercial-administrative center from its beginning. It commanded the mining wealth and commercial markets of the north and its commercial influence determined the fate of the Pacific ports of Mazatlan, San Blas, and Manzanillo. Guadalajara was not strongly dependant on the trade with Mexico City, the capital. With the concentration of religious, political, military, and cultural functions during the colonial period, the city became relatively autonomous from the capital especially during the 19th century when the struggle between the central authority and regional autonomy reached a critical stage.

With the increment of communications and industry during Porfirio Diaz's dictatorship at the end of the 19th century the economy expanded creating propitious conditions for the city's growth. The Mexican Revolution and the decay of the mining cities slowed the development of Guadalajara for more than 15 years. After the pacification of the country around 1920, commercial activities increased to a considerable extent resulting in a strong migration from adjoining regions. In the 1950s the city nearly doubled its population. This impressive growth trend has been sustained; it now has the fourth highest rate in the country.

3. ECONOMY. Commerce has been the mainspring of Guadalajara. This has lead to the concentration of services at a regional scale including education, health, culture, finances, religion, and tourism. It is a natural conduit for merchandise and products to and from the center of Mexico to the northwest regions. It controls the trade of foodstuff, fruits and vegetables of the northwestern part of the country.

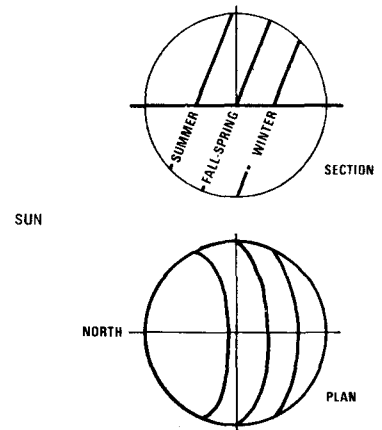
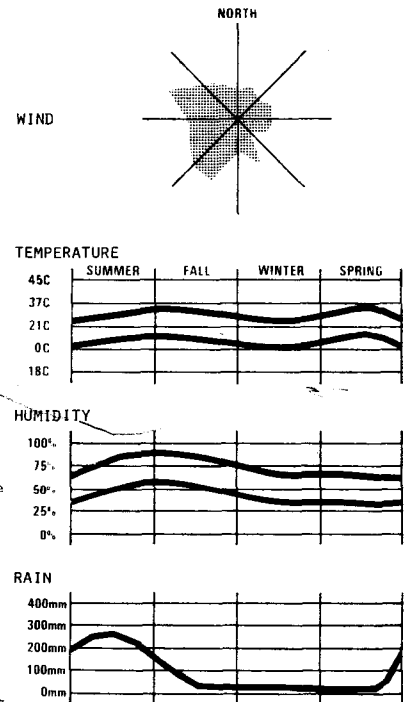
In 1970, 29% of the city's population was in the labor force, 3% of these were officially unemployed, but the actual figure seems to be higher. 6.5% of the labor force was em-

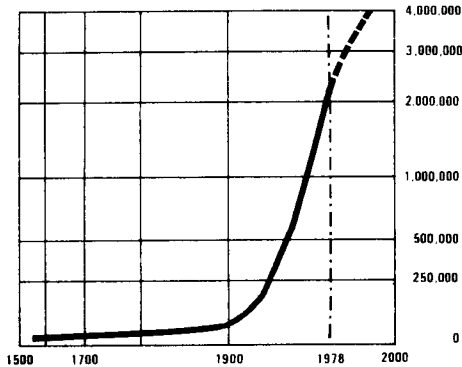
ployed in agriculture and cattle raising. Industry and crafts play a secondary role in the economy because most of manufactured goods come from Mexico City, Monterrey and the U.S.A. This sector provides jobs for 43% of the labor force. Commerce and services provide jobs for 51% of the labor force and is the backbone of Guadalajara's economy.

4. GOVERNMENT. The state of Jalisco has an area of 80,150 km<sup>2</sup>. It is divided into 124 municipalities, including Guadalajara which is by far the dominant. The PRI candidate for state governor is appointed by the presidential candidate, following a pattern of reconciliation of federal and local interests. The candidate competes in elections against very weak or generally token opposition and is elected. The authority is for six years. The different state department delegates are appointed directly by the governor and their authority is limited to their respective departments, taxation, public works, health, education, etc. The city is governed by a president and officials who are elected every three years. The state governor however, has a strong influence in local city affairs due to the comparative importance of the city at state level. The Guadalajara metropolitan area encompasses four municipalities, but they have relatively little power to tax or to mobilize fiscal resources. Major services are provided on a shared basis between federal, state and local government but principal action is concentrated on only one out of the four municipalities as a consequence of the lack of coordination and uneven resource distribution among them. Since the 60's a department of urban planning was formed, which is responsible for coordination and control of projects related to urban growth. Unfortunately, duplication of functions, extensive bureaucracy and strong interests obstruct the formulation of useful and effective policies concerning low-income housing.

5. DEMOGRAPHY. Although between 1910 and 1920 the population of the country dropped because of the revolution, Guadalajara's population increased by 20% due mainly to low revolutionary participation. In the decade of the 20's an equilibrium between urban and rural population growth was

GUADALAJARA  
LATITUDE 20° 40' N  
LONGITUDE 103° 20' W  
ALTITUDE 1,550 meters





**URBAN POPULATION GROWTH**  
horizontal: dates vertical: population  
Source: DPUEJ

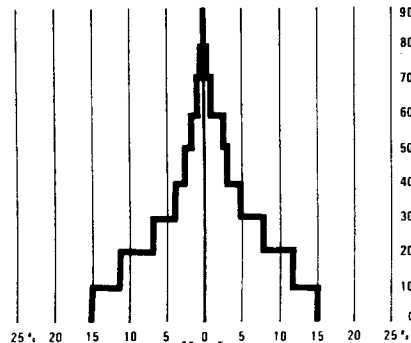
achieved caused by the distribution of rural land after the revolution. From 1940 to 1950, the general economic development of the country started. The cities offered new opportunities and Guadalajara grew by 64%. In the 1950's, migration from rural areas reached a peak with the population increased 96% of which the rural migration represented 58%. Between 1960-1970, the population growth was 62% and rural migration slowed down. By 1976 the metropolitan population exceeded 2 million. It is estimated that the city will contain 5.5 million by the year 2000.

The rest comprise high-income groups.

**8. URBAN GROWTH.** In a span of 40 years, from 1900 to 1940, the population and the area of the city increased two times. In contrast, between 1940 to 1975 the population and the area increased three times. This unexpected and unplanned expansion has always been at the expense of relatively fertile agricultural land. In addition to this, absence of severe natural features of the Atemajac valley, strong land speculation, and the lack of regulations regarding urban concentration, have promoted uncontrolled urban sprawl.

are in sight, the situation will tend to worsen. The following low-income housing systems, the approximately served population, and the responsible sector are indicated:  
Squatters. 1% Popular  
Tenements. 17% Private/popular  
Illegal subdivision. 16% Popular  
Private speculative. 35% popular/private  
Public housing. 6% Public  
Old traditional. 17% Private/popular  
(further information can be found in the introduction, and case study sections of this work.)

The city government maintains a housing program that deals with the up-grading of tenements, the results, in terms of dwelling units up-graded are still very poor. Only 10% of the total number of tenements have

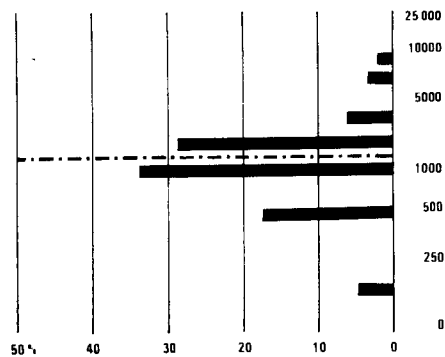


**URBAN POPULATION DISTRIBUTION**  
horizontal: percentages vertical: ages  
males: M females: F  
Source: DPUEJ

**6. SOCIO-CULTURAL.** The social system, as in most of the country, is one in which traditional values, institutions and patterns coexisted with those arising from economic development and social change. But equality of participation in socio-economic development has been only partially successful. Even when there are no major ethnic or cultural differences, three characteristic class lines can be distinguished. The upper class - large storekeepers, landlords, owners of the means of production - hold the highest political positions. The middle class - small, emergent, and heterogeneous - occupies mid-level professional, commercial and bureaucratic positions. In the lower class, economic and cultural variation are largest than in the others. It is composed of blue collar workers to recent migrants, urban dwellers living in tenement slums or illegal settlements. They reap few benefits from the economic expansion which excludes them. Guadalajara for centuries has been represented by traditional ideas and thought that have strongly characterized its socio-cultural development, the Roman-Catholic church and low-risk speculative/commercial activities are the main examples.

**9. HOUSING.** For the time being 45% of the population is unable to afford dwelling units/services that meet city regulation standards. The 1970 census indicated that: 20% of the housing stock lacked sewage, electricity and water; 50% of the total dwelling units were rental units; 14% of the housing stock had an area of less than 20m<sup>2</sup>. Up to the present time these figures seem to be much higher. The public sector has not been able to alleviate the problem, neither in the provision of utilities, services, and community facilities, nor in the provision of dwelling units. The contribution of the government only accounts for 6% of the stock.

been up-graded. Since 1974, self-help programs sponsored by the city government have been developed, unfortunately without successful results. The state government, through the planning department, is trying to implement a new housing program based on the concept of site and services. The aim of this program is to provide, at least, 200 Has. per year of low-income projects financed with public resources; before it gets started, contradictions in the level of services are already evident, due to the actual regulations and codes.



**URBAN ANNUAL INCOME DISTRIBUTION**  
horizontal: percentages vertical: dollars  
Source: DPUEJ  
Minimum Official Wage 1978 - - - - -

**7. SOCIO-ECONOMIC.** 56% of the population, the low and very low income, earn less than US \$ 900 per annum. (1970). 25% consist of moderately low and middle low income who earned less than US \$ 1800 a year. (1970), while 10% made between US \$ 1800 and US \$ 3000. 56% of the labor force was paid less than the official minimum wage in 1970.

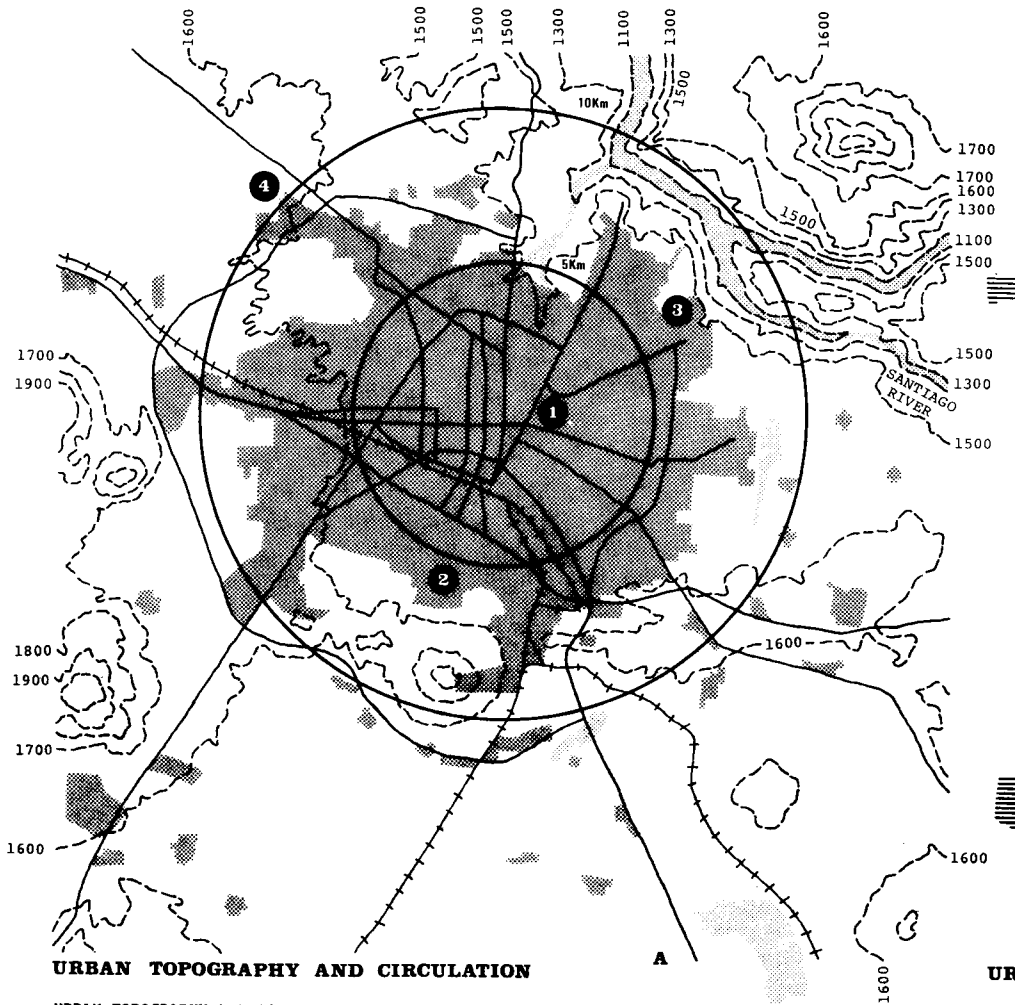
The private sector had traditionally supplied land and limited services for the low income during the last two decades, but the declining economical situation of these groups, therefore, their incapacity to pay for the minimum dwelling/services required by law, has oriented the private capital towards middle and high income developments. The popular sector, since 1970 has been able to solve the land/dwelling shortages without any kind of support, by illegally settling on government land "ejidos".

It is estimated that in order to cope with the urbanization demand, 400 Has. of land are annually necessary. From 1970 up to the present time, about 1000 Has. have been informally occupied by the low-income, following the pattern of illegal subdivisions.

From now on, the government has to deal with this unprecedented demand for services that, as soon as consolidation occur, will represent a serious political pressure. Since no signs of radical solution to the "ejidos" problem

**URBAN CONTEXT SOURCES**

- Topography and Circulation: (accurate) CETENAL.
- Growth Pattern: DPUEJ.
- Growth Pattern: (accurate) DPUEJ
- Land Use Pattern: (accurate) DPUEJ. COPLAUR.
- Density Pattern: (accurate) IBID
- Income Pattern: (accurate) IBID
- Land Value Pattern: (accurate) CATASTRO.
- General Information: "Estudio de Funciones Urbanas" DPUEJ, 1976.
- CENSUS, 1970, SIC.
- "Guadalajara y su Region" Riviere, 1970.
- "Guadalajara: Un Analisis Urbano" Ibanez, 1970.
- Plan General Urbano, DPUEJ.
- DPUEJ, Reports and publications.



**URBAN TOPOGRAPHY AND CIRCULATION**

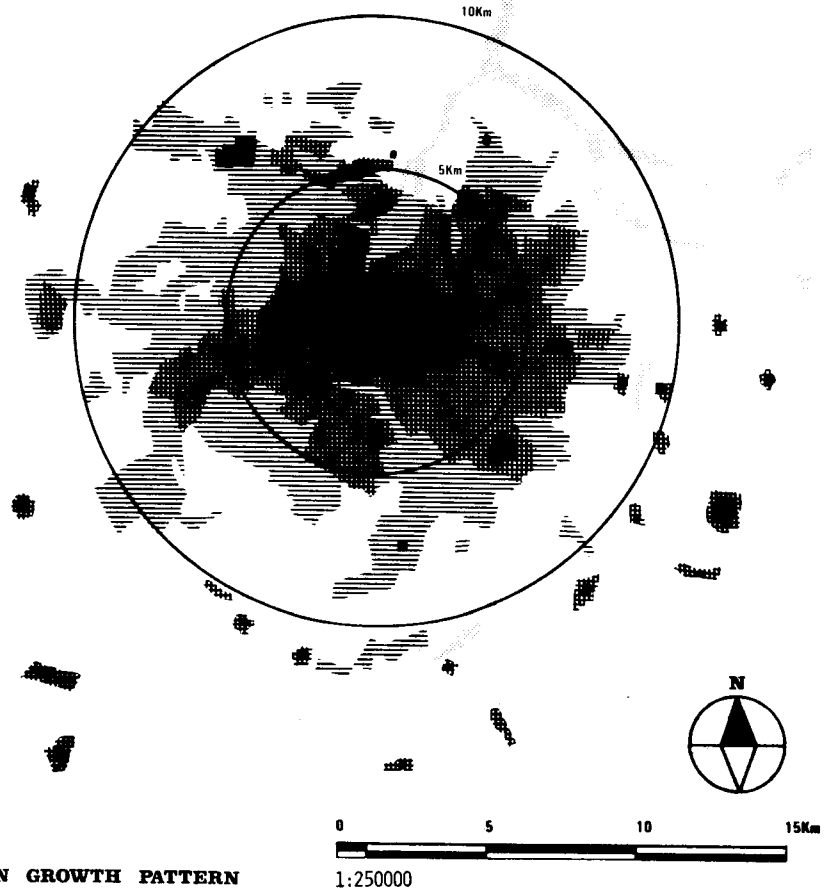
URBAN TOPOGRAPHY AND CIRCULATION: The Ateamac Valley in which the city is located, is 1550 mts. above the sea level. It is bounded by the Santiago river that meshes with the Verde river to the northeast. The Primavera hills enclose the valley to the west and several small hills encircle the city to the south.

The urban circulation pattern is determined by the commercial activities and business operations typical of the traditional city center, where all urban transportation routes cross. Regional traffic is canalized from and to the main highways by a recently built peripheric road that is encouraging numerous settlements outside the valley's limits.

**KEY**

- A** Airport
- Primary Road
- ++++ Railroad
- ▨ Built-up Area

- ① SAN JUAN DE DIOS
- ② COLONIA ECHEVERRIA
- ③ SANTA CECILIA
- ④ LA TUZANIA



**URBAN GROWTH PATTERN**

URBAN GROWTH: Originally three principal small towns, Atemajac to the north, Zapopan to the northwest, and San Pedro to the Southeast, where located as independent semi-rural communities around the old compact city. Up until 1940 the physical development of the city followed a pre-automobile pattern. The different parts of the city were clearly defined following a simple neighborhood model. From 1940 to 1960, the economic expansion, rural migration, extensive introduction of automobiles, land speculation and the general urgent pressure of rapid urbanization altered the old steady development and the population increased 160% in this period. From 1960 to 1975 the rapid growth of the last period continued.

**DATES**

- ▨ 1940
- ▨ 1960
- ▨ 1975






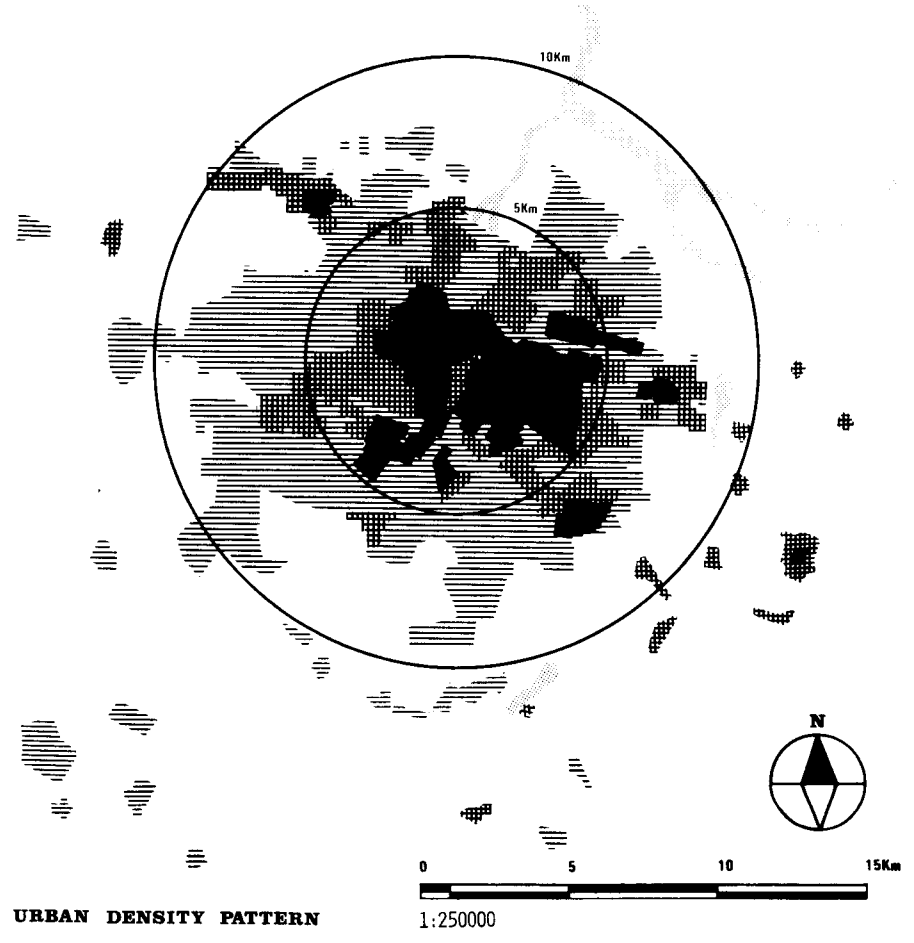
**URBAN LAND USE PATTERN**

URBAN LAND USE PATTERN: Main commercial activities are concentrated in the city center and along principal avenues. American, car-oriented shopping centers for high income people have recently been built in different parts of the city, but the historical importance of the core remains.

The location of industry follows a linear pattern along an east-west axis that parallels railroad access. New industrial areas have been started, but they remain relatively minor and sparsely developed. Some manufacturing industries and craft industries are scattered throughout the city according to the economic advantages of their location; the strongest are involved in popular crafts: San Pedro and Tonalá, both to the southeast.




Practically all community facilities are concentrated in a 4 km radius from the historical center.

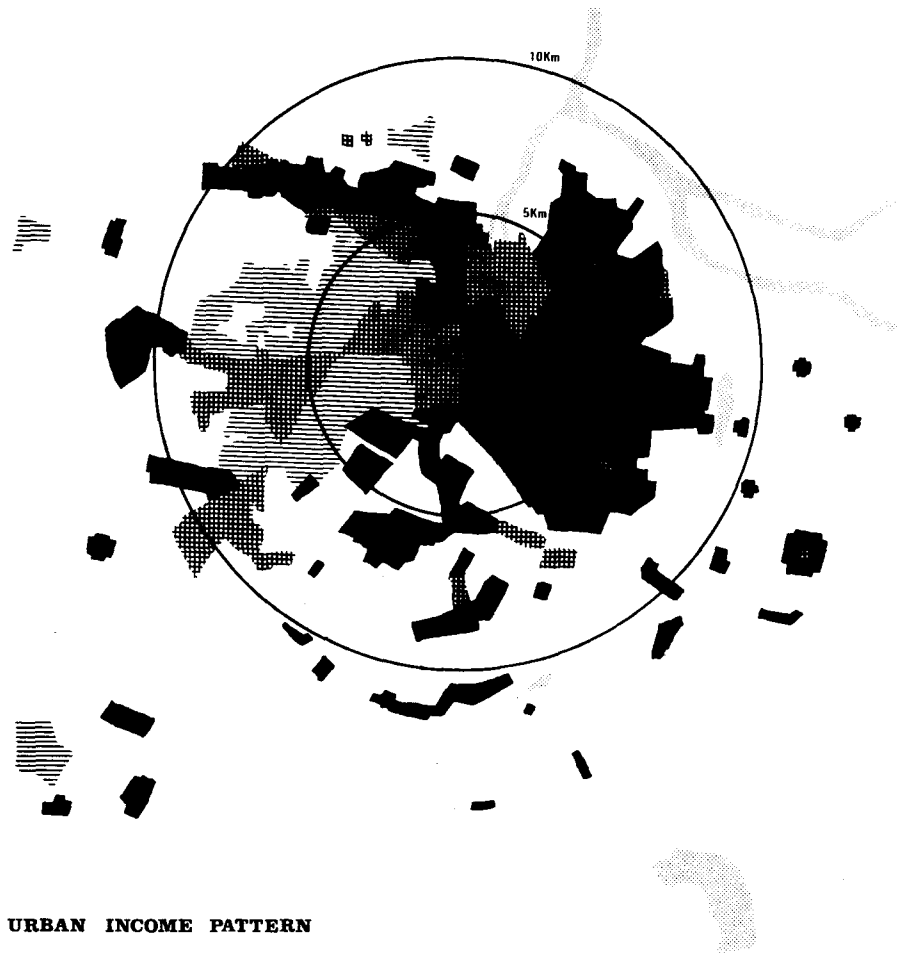
AREAS	
	RESIDENTIAL
	COMMERCIAL
	INDUSTRIAL



**URBAN DENSITY PATTERN**

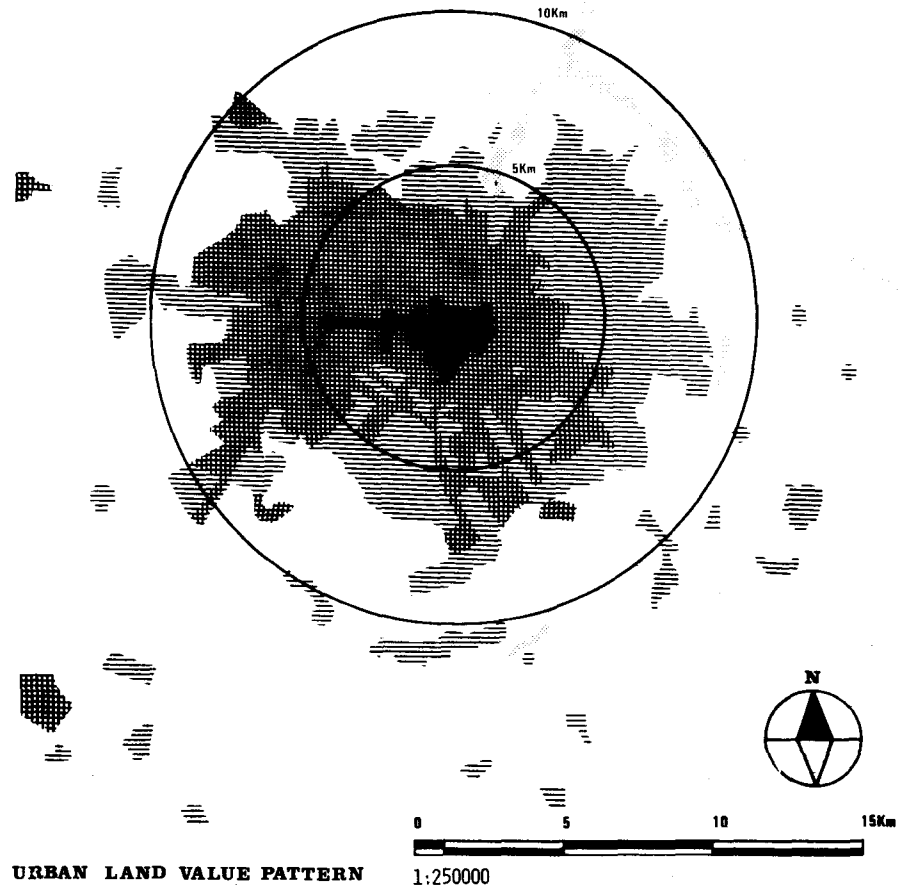
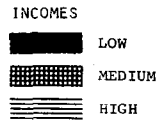
URBAN DENSITY PATTERN: The highest densities are located around the historical nucleus and in the old towns that surround the city. This concentration is due to the abundance of tenements, old speculative developments and old traditional types of settlements. Complete utilities, services and community facilities are provided in these areas. Medium densities are found in new speculative developments, old illegal developments, as well as old high-income suburbs and middle-income communities. Low densities are found in the areas newly developed since 1970. Increasing commercial pressure, rising rents, and high land taxes to pay for various large-scale public works in and around the old historical high density areas, are displacing low-income dwellers towards the outskirts of the city.

DENSITIES	
	HIGH
	MEDIUM
	LOW



**URBAN INCOME PATTERN**

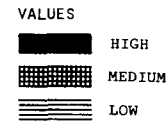
URBAN INCOME PATTERN: Low and very low income groups are settled in the center and towards the eastern side of the city, but they are now settling outside of these areas particularly in the north, northeast, south, and southwest, where availability of government land ("tierra ejidal") allowed an uncontrolled flow despite the lack of services or community facilities. Moderate-low and middle income groups are located in both the inner ring and in some peripheral new developments on the western side contiguous to high and very high income settlements. These two groups, who own the land in the inner ring, initially changed their former dwellings into rental units but now are displacing the tenants in order to speculate with the land expecting a higher commercial revenue in the future.



**URBAN LAND VALUE PATTERN**

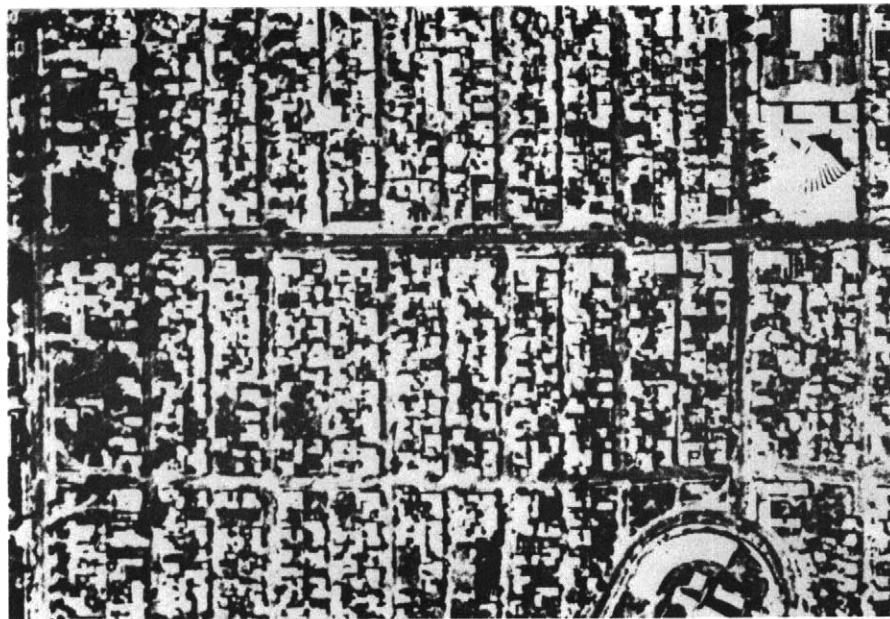
1:250000

URBAN LAND VALUES: The land values follow a similar pattern paralleling urban growth. Very high values are concentrated in the historical center as well as along main commercial avenues. High values surround this area at a radius of 3 km but vary somewhat according to the level of services and to the commercial potential of the area. Low and very-low values are found mostly in new speculative developments, new low-income settlements, old and new illegal developments and social depressed areas.

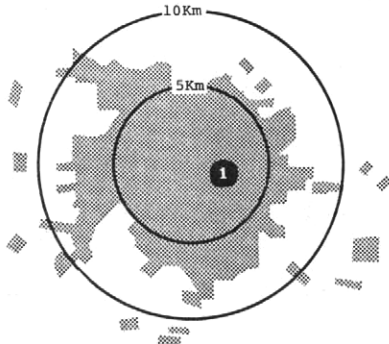


AERIAL PHOTOGRAPHS, OPPOSITE PAGE:  
 THE FOUR CASE STUDY LAYOUTS: (top left) San Juan de Dios. (top right) Colonia Echeverria. (bottom left) Santa Cecilia. (bottom right) La Tuzania

# CASE STUDIES



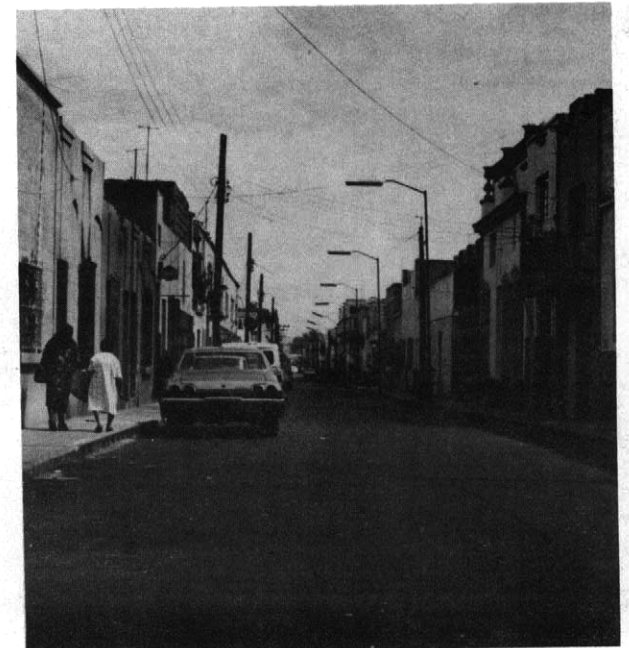
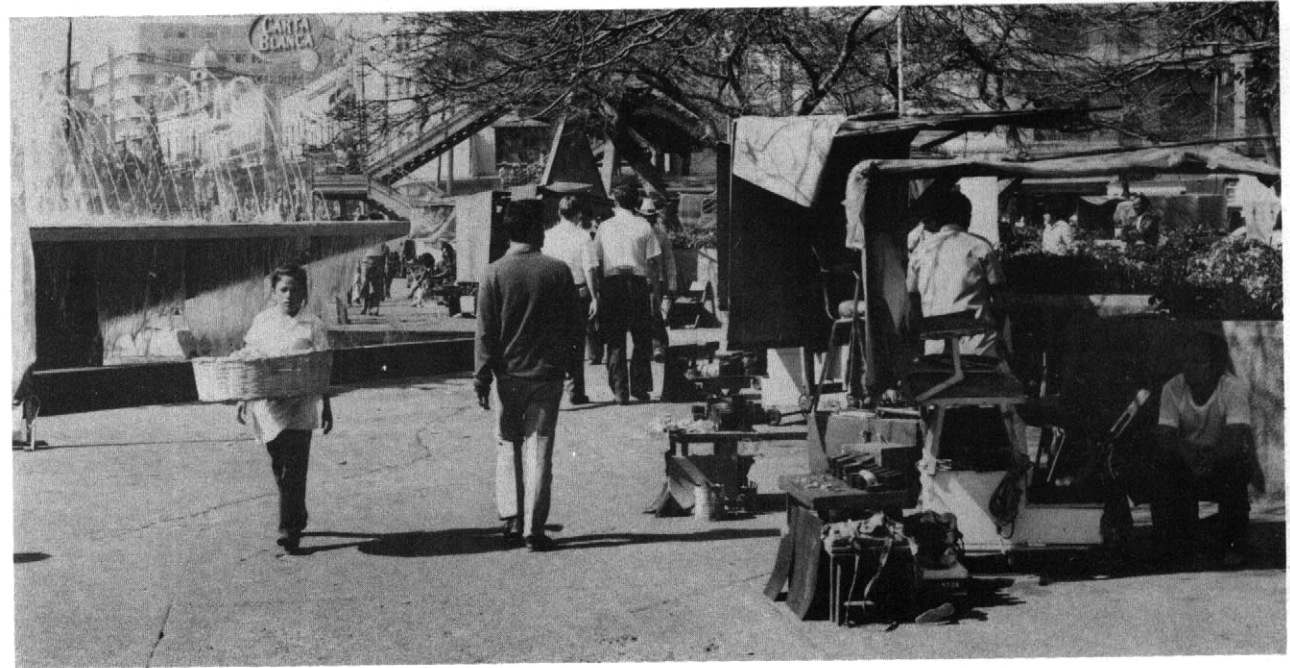
# 1 SAN JUAN DE DIOS TENEMENTS

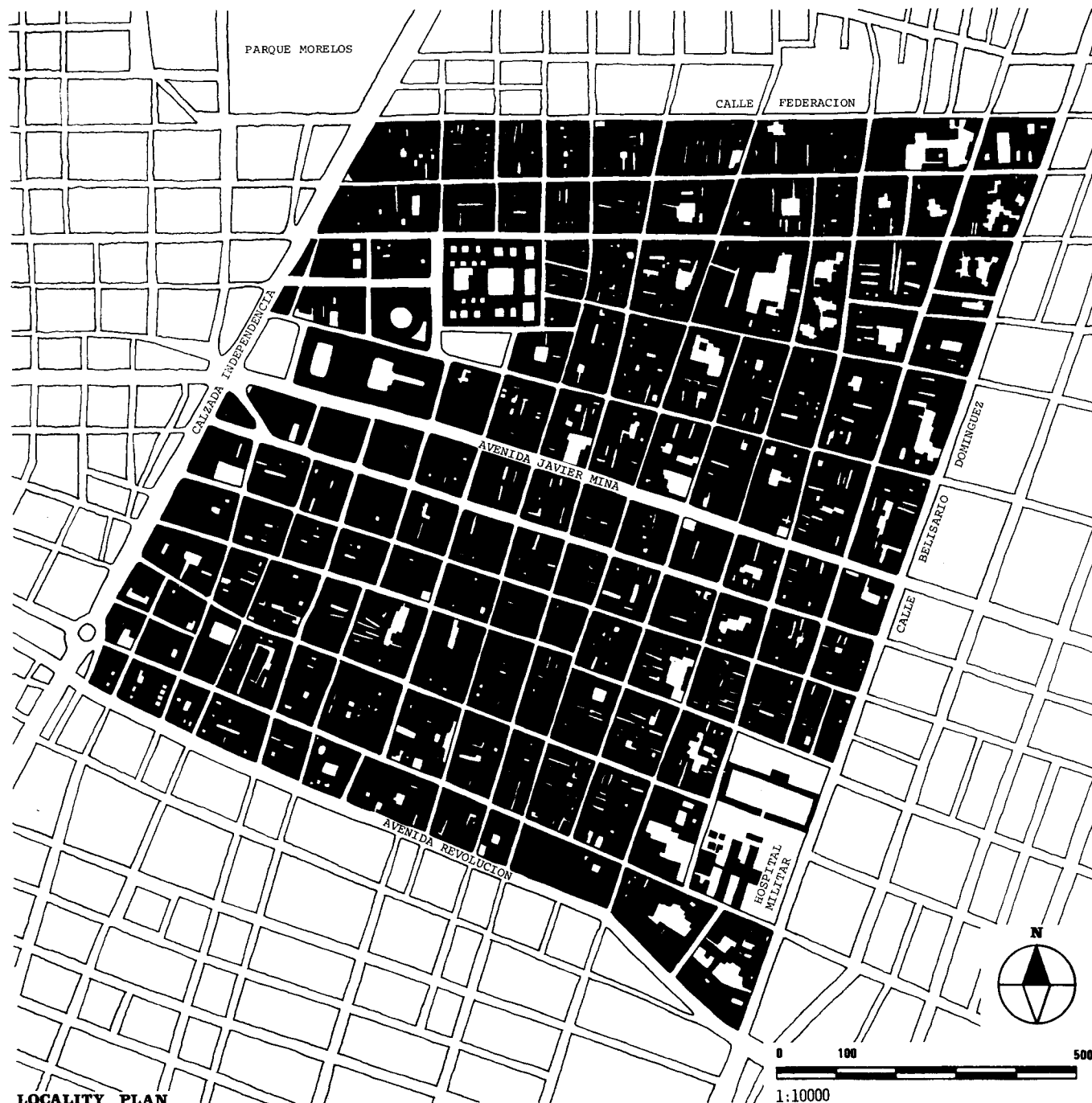


LOCATION: The area of Guadalajara known as San Juan de Dios is adjacent to the central commercial zone, only separated by the Calzada Independencia, a main circulation avenue running north-south.

ORIGINS: Originally the natural limits of Guadalajara were bounded to the east by the San Juan de Dios river that today runs in pipes below the Calzada Independencia Avenue, carrying the main sewage of the city. On the other side of the river a very low income community started to develop in the 17th century. Numerous stables and farms were also located there. An orphanage and several churches built during the seventeenth and eighteenth centuries complemented the commercial activities. As opposed to the city center commercial area a "tianguis" (informal market) developed that soon became the city's low-income market and regional fruit/vegetable trade center. These activities provided employment and opportunities for marginal employment which attracted new low-income families. These groups generally lived in expressly built tenements or in rental rooms in single-family dwellings.

After the channelization of the San Juan de Dios River and the remodeling of the city center in the 1950s the commercial activities expanded into the old big houses situated along the Calzada Independencia, Oregon, and Mina Avenues. Small-scale industrial activ-





LOCALITY PLAN

ities also developed, as well as entertainment centers, second class hotels, public baths, etc., which displaced the stables and farms towards the surrounding areas located mainly toward the east.

At the present time, only few single-family houses are left, for most use have been converted into shops/industry, apartments and tenements.

The availability of services and community facilities as well as multiple sources of employment and marginal employment derived from another market constructed in the mid 50's accentuated the housing demand which was met mostly in the form of tenement rooms. Continued expansion of commercial and industrial activities has confined the low-income families to the east of the remaining densely populated central area.

**POPULATION-INCOME:** The population of San Juan de Dios is composed of a heterogeneous working class of very low and low income people. A relatively small proportion of moderate-low income residents has given rise to distorted image of the locality population characteristics.

**LAYOUT:** The street pattern of the area follows a typical Roman-Spanish grid layout continuing from the city center. The blocks become larger as a result of the small natural slope of the site. Streets are 12m. wide and there are only few open spaces, therefore the street is used intensively by both pedestrians and vehicles.

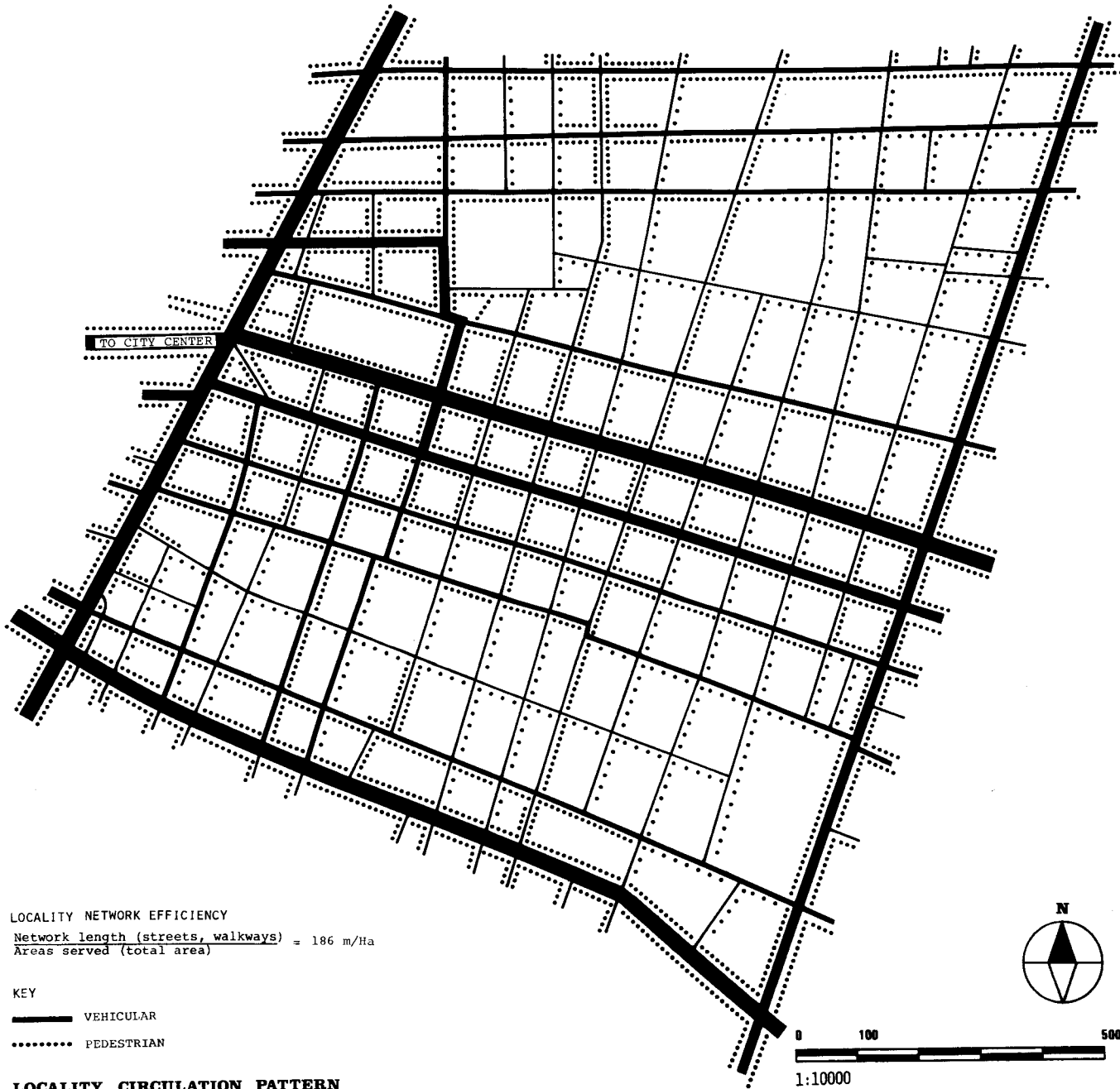
Its boundaries to the north are not clearly defined so the locality meshes gently with the adjacent neighborhood. To the south a man-made barrier, Revolucion Avenue confines the neighborhood and separates it from a relatively dense low-income area; the Belisario Dominguez Avenue bounds the locality to the east which also acts as a barrier to a private speculative development built in the 1940's; and to the west, separated from the city center by the Calzada Independencia and only linked by several pedestrian bridges, the locality is limited by a dense an busy commercial area whose main nucleus is the San Juan de Dios market.

**PHOTOGRAPHS, OPPOSITE PAGE:**  
 SAN JUAN DE DIOS: (top) Characteristic marginal employment in the San Juan de Dios Plaza.  
 (left) San Juan de Dios Public Market, stalls invading the street.  
 (right) A typical residential street.



CIRCULATION: All street are paved and available to both vehicular and pedestrian use, but due to the layout of the city, most of the through traffic runs east-west. Major city arteries bound three sides of the locality: Calzada Independencia Avenue and Calzada del Ejercito Avenue run north-south; Revolucion Avenue runs east-west. The fourth side is bounded by a local street that serves as a meshing boundary with the adjacent community. Another major city artery Javier Mina Avenue crosses the site dividing it into two similar areas linked by several pedestrian bridges connecting the market. Pedestrian circulation to and from the city center is canalized by several pedestrian bridges that cross the Calzada Independencia Avenue.

Extensive traffic lights and traffic signs are placed throughout the locality to regulate and control traffic. Limited parking facilities exist on top of the San Juan de Dios market and adjacent buildings.



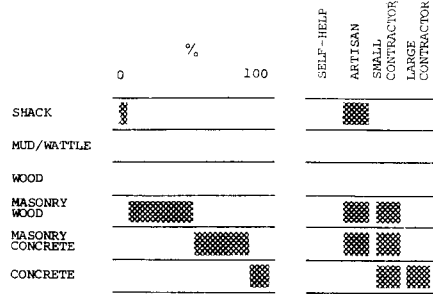
LOCALITY NETWORK EFFICIENCY  
 Network length (streets, walkways) = 186 m/Ha  
 Areas served (total area)

KEY  
 ——— VEHICULAR  
 ..... PEDESTRIAN

**LOCALITY CIRCULATION PATTERN**

1:10000

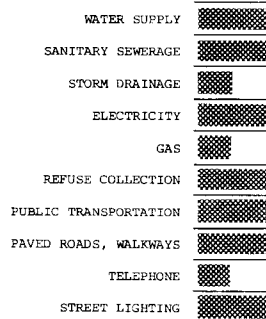
LOCALITY CONSTRUCTION TYPES



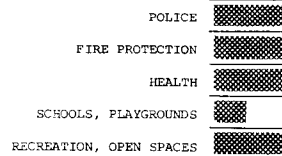
The chart shows (1) approximate percentage of each construction type within the total number of dwellings and (2) building group that generally produces each type.

Quality of information: Approximate

LOCALITY UTILITIES AND SERVICES



LOCALITY COMMUNITY FACILITIES



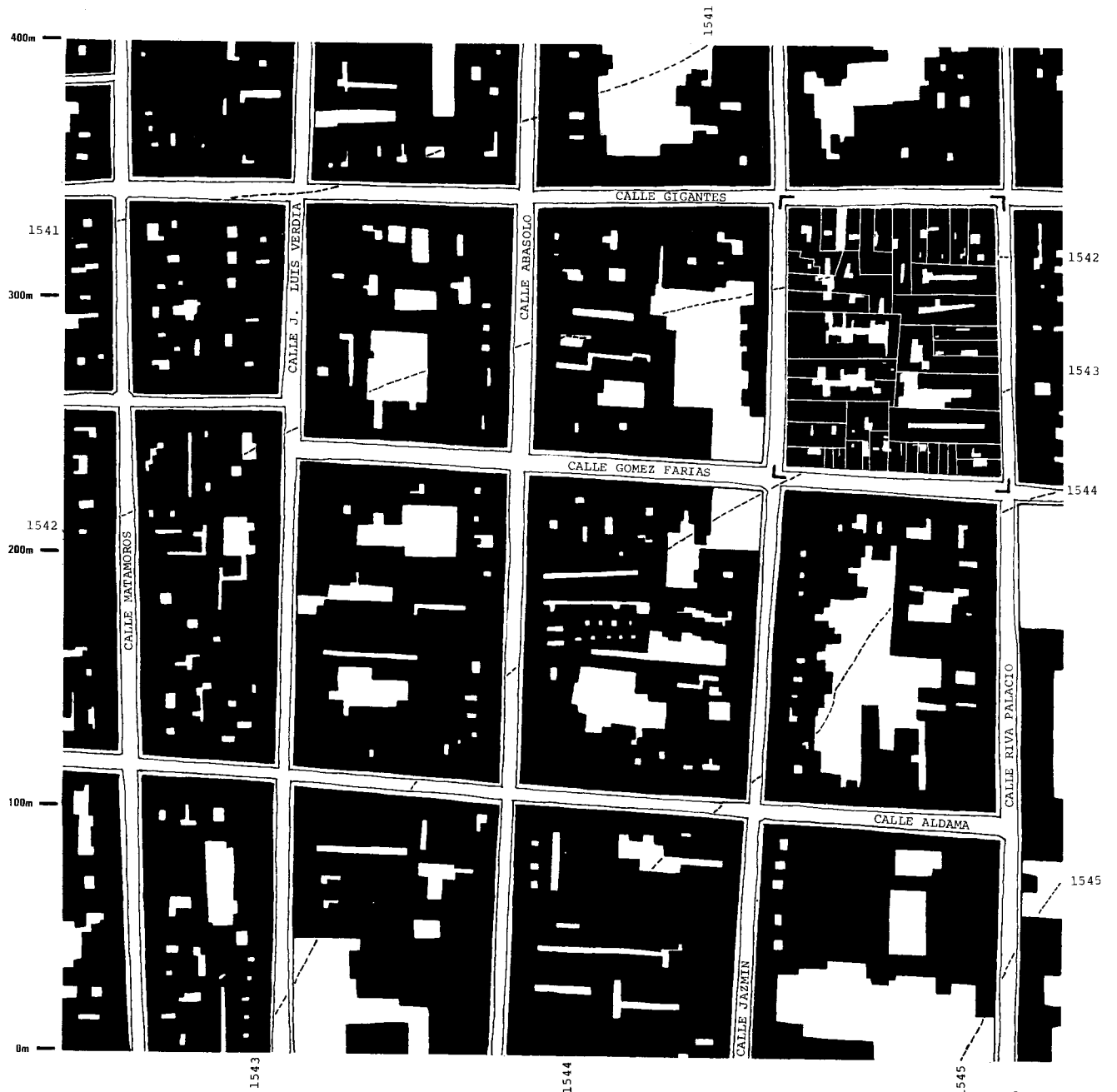
The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.

Quality of information: Accurate

[ ] SELECTED BLOCK

NETWORK EFFICIENCY

Network length (streets, walkways) = 200 m/Ha  
Areas served (total area)

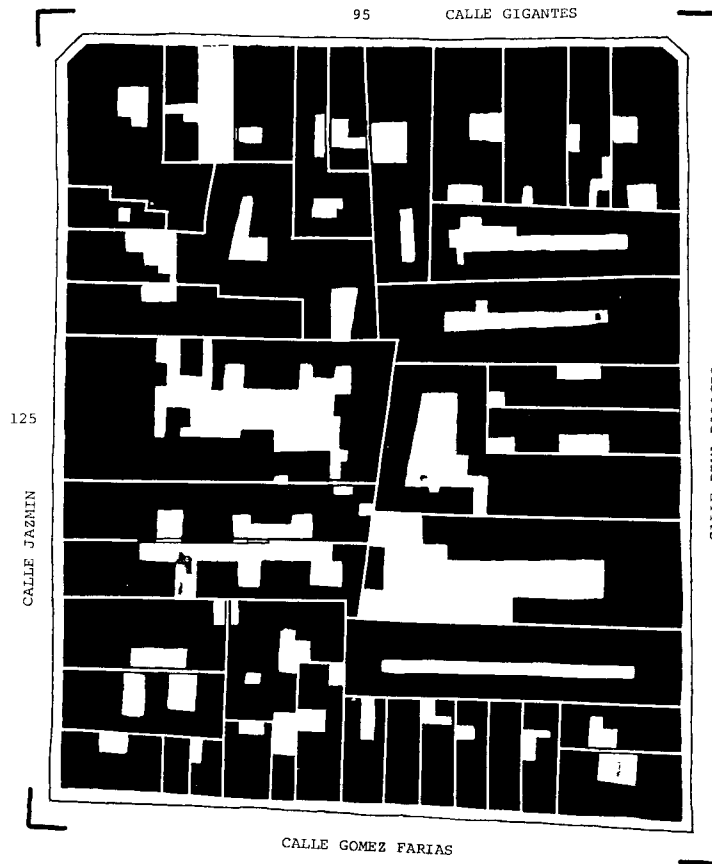


LOCALITY SEGMENT PLAN

0 50 100 150m

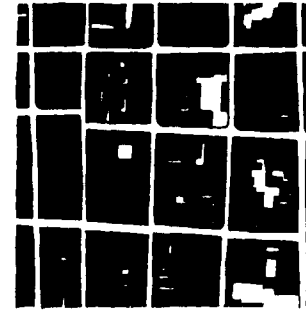
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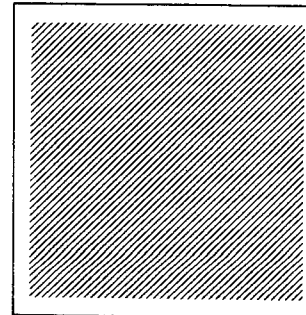
LAND UTILIZATION DIAGRAMS

16 Hectares



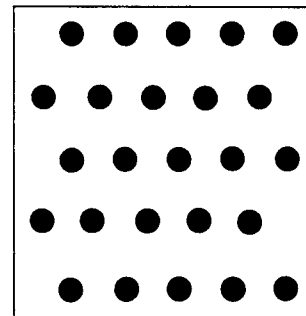
**PATTERN**  
 Public: streets/walkways [white box]  
 Private: lots dwellings [black box]

1 Hectare



**PERCENTAGES** Streets/Walkways 18  
 Dwellings/Lots 82

1 Hectare



**DENSITY** Persons/Hectare 500  
 ● 20 Persons

**LOCALITY SEGMENT:** The typical segment is essentially residential. The typical blocks are 100m. long with an average street width of 12m. Like other old settlements, land coverage is quite high. At this scale the characteristic long courts of the tenements are clearly shown. The rational economical subdivision of the site, and the definite public space around the mass of the blocks is also clear.

**BLOCK:** Like most other blocks in this area, the original block subdivision has been altered to increase the number of lots. Many single-family dwellings have been converted into tenements, or the lots have been subdivided into relatively small sizes to build rental low-income, individual houses or small walk-up apartments.

A spontaneous variety of choices in terms of dwelling characteristics is found as a result of a free or natural progressive subdivision of the block.

All the blocks have a narrow sidewalk of 1m. The streets, especially those running north-south are used as children's playground or as an extension of the private areas, due to the absence of vehicular traffic in that direction.

The left side of the street is generally used as parking, allowing only one vehicle to pass.

LOCALITY BLOCK LAND UTILIZATION DATA

DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	38	.98	39
DWELLING UNITS	82	.98	84
PEOPLE	492	.98	500

AREAS	Hectares	Percentages
PUBLIC (streets, walkways)	.21	18
PRIVATE (dwellings, shops, factories, lots)	.98	82
<b>TOTAL</b>	<b>1.19</b>	<b>100</b>

NETWORK EFFICIENCY

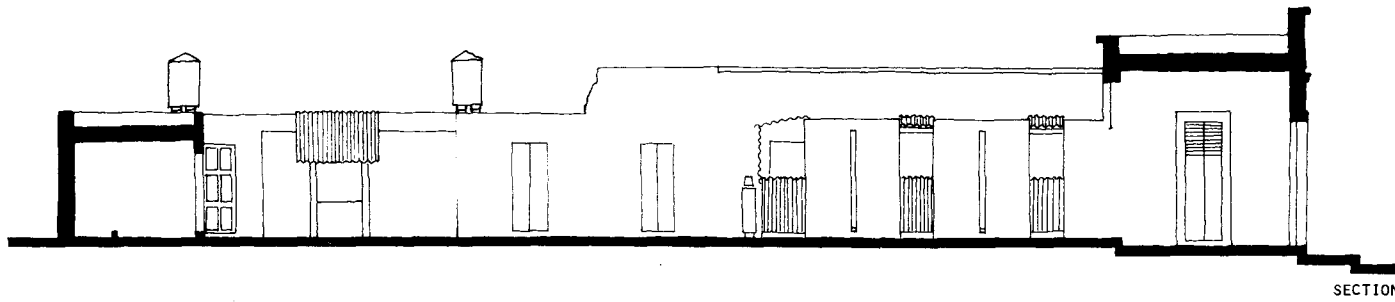
Network length (streets, walkways) = 184 m/Ha  
 Areas served (total area)

LOTS

Average area, dimensions = 260 , 10/25

LOCALITY BLOCK LAND UTILIZATION

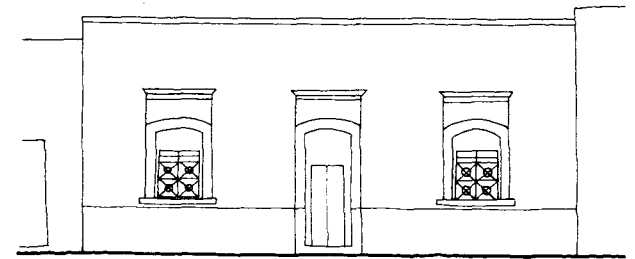




SECTION

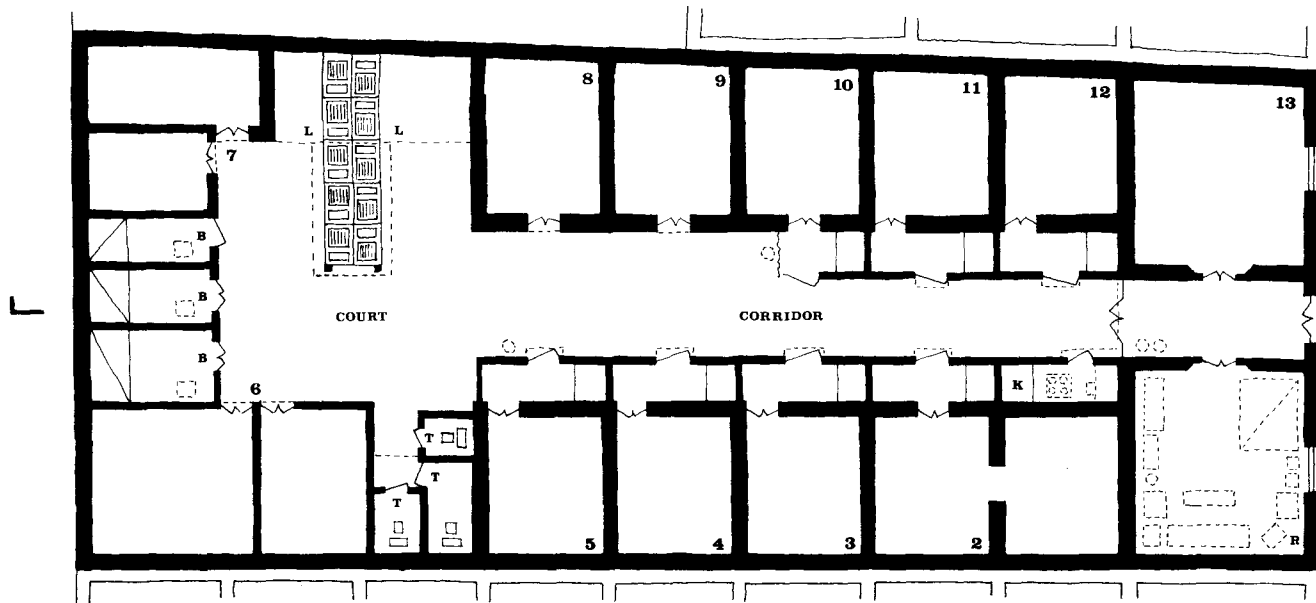
KEY

- R Room (multi-use)
- K Kitchen/Cooking Area
- L Laundry
- B Bathroom
- T Toilet



ELEVATION

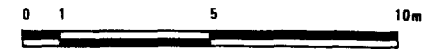
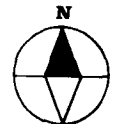
PLAN



CASE STUDY SOURCES

- Plan: (approximate) CATASTRO Air photographs and plans, 1975.
- Field survey 1976-1977. DPUEJ.
- Land Use Pattern: (approximate) IBID
- Circulation Pattern: (approximate) IBID
- Segment Plan: (approximate) IBID
- Block Plan: (accurate) IBID
- Typical Dwelling: (approximate) Field survey 1976-1977
- Physical Data: (accurate) IBID
- Photographs: The Author 1976-1977-1978
- Other Information: Field survey 1976-1977-1978. DPUEJ. ITESO 1974. H. Ayuntamiento de Guadalajara.

STREET



1:200

TYPICAL DWELLING

## PHYSICAL DATA

(related to dwelling and land)

DWELLING UNIT  
 type: Room  
 area (sq m): 20  
 tenure: Legal Rental

LAND/LOT  
 utilization: Semi-Private  
 area (sq m): 480  
 tenure: Legal Rental

DWELLING  
 location: City Center  
 type: Row/Grouped  
 number of floors: 1  
 utilization: Multiple  
 physical state: Fair

DWELLING DEVELOPMENT  
 mode: Incremental  
 developer: Private  
 builder: Small Contractor  
 construction type: Adobe-Masonry-Wood  
 year of construction: 1941

MATERIALS  
 foundation: Stone  
 floors: Cement Tiles  
 walls: Adobe-Brick  
 roof: Brick Vaults

DWELLING FACILITIES  
 wc: 3, Shared  
 shower: 3, Shared  
 kitchen: 1  
 rooms: 1  
 other: Shared Laundry Facility

## SOCIO-ECONOMIC DATA

(related to user)

GENERAL: SOCIAL  
 user's ethnic origin: Northern Guadalajara  
 place of birth: Jalisco  
 education level: Primary

NUMBER OF USERS  
 married: 4  
 single: -  
 children: 1  
 total: 5

MIGRATION PATTERN  
 number of moves: 2  
 rural - urban: 1950  
 urban - urban:  
 urban - rural: 1969  
 why came to urban area: Employment

GENERAL: ECONOMIC  
 user's income group: Very Low  
 employment: Watchman  
 distance to work: 5 Km  
 mode of travel: Public Transportation

COSTS  
 dwelling unit: \$ 600  
 land - market value: \$ 20,000

DWELLING UNIT PAYMENTS  
 financing: \$ 15 / Month  
 rent/mortgage: \$ 15 / Month  
 % income for rent/mortgage: 30 %

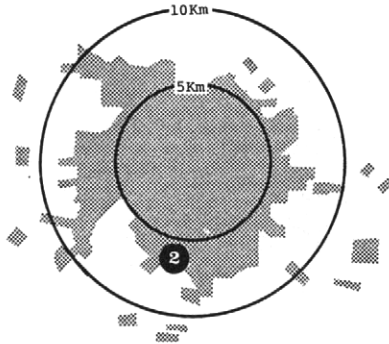
## PHOTOGRAPHS:

SAN JUAN DE DIOS: (top) Commercial street adjacent to the market.  
 (left) A tenement court.  
 (right) A dwelling unit in a tenement.



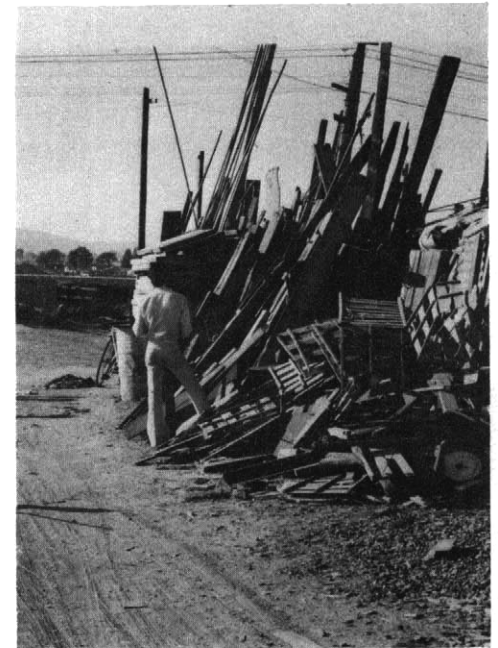
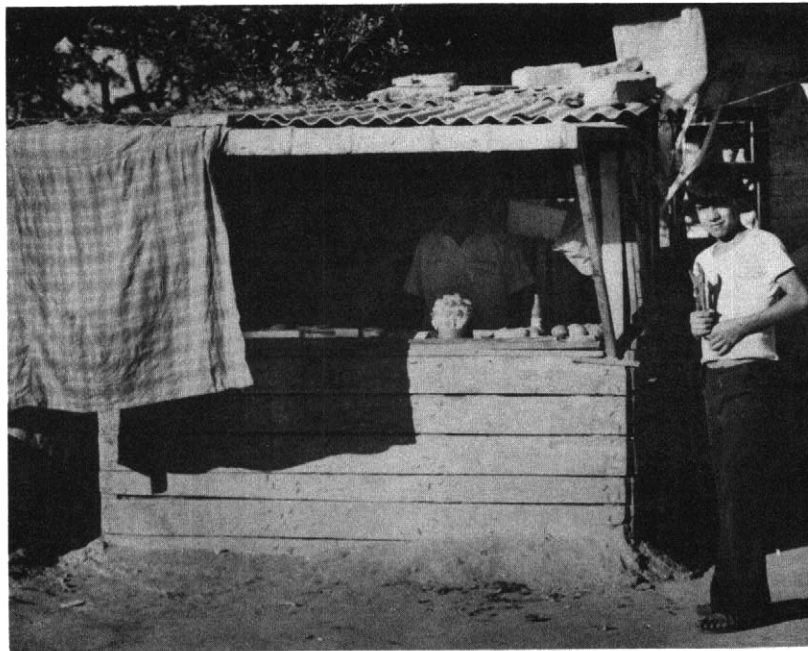
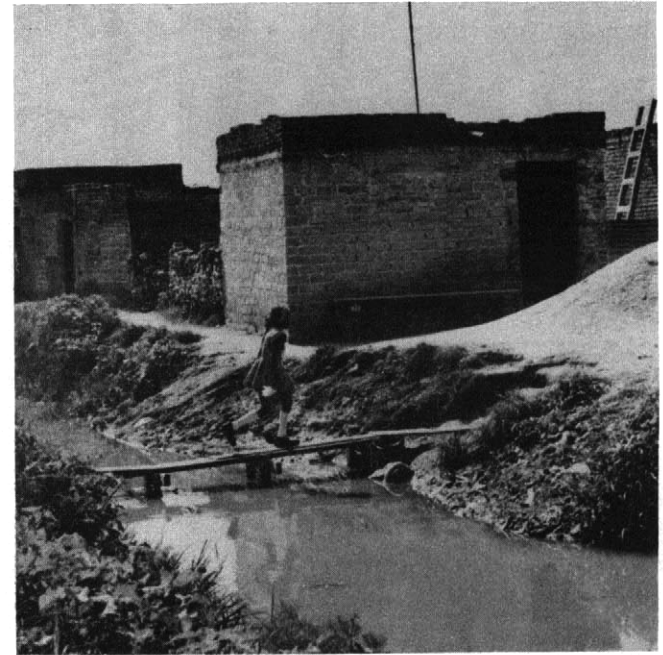
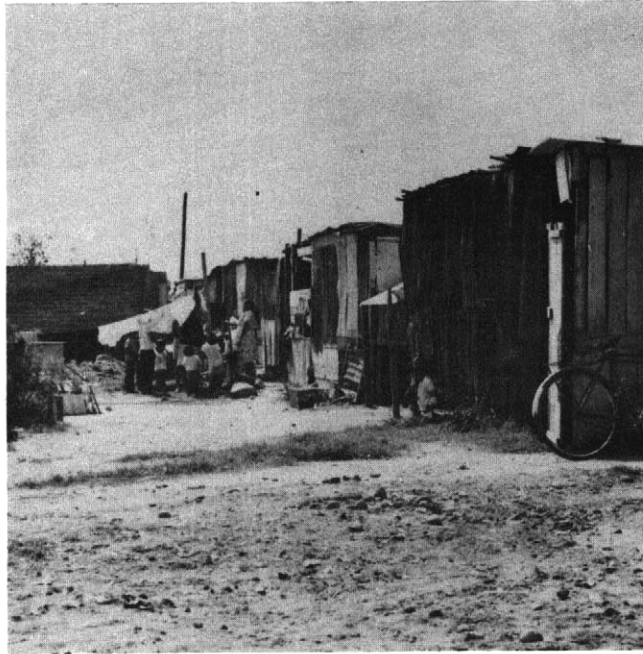
## 2 COL. ECHEVERRIA

### ILLEGAL SUBDIVISION



LOCATION: This is a newly developed area located on the southern fringe of the city, about 5 km away from the city center. The new industrial area is adjacent to the northern side.

ORIGINS: The declining national economic situation, that makes impossible for the majority of the population to pay for the typical low-income lots in private speculative developments, the surplus of government land ("ejidos") around the city, and the incapacity of the authorities to lower urban design standards in order to cope with the increasing demand, combined with the massive migration to the city during the last seven years, have provoked these types of illegal developments. The site, formerly used for agriculture, was cultivated by peasants ("ejidatarios") that began to sublet or sell the land when they found that the housing demand made this illegal operation more profitable than growing crops. By 1970 only the area adjacent to 8 de Julio Avenue was occupied by dwellings, in 1975 more than 80 has had been sold for residential use but still 200 has of cultivated land were in use. It is estimated that by now more than 150 has have been sold. It is not difficult to foresee that in four more years the whole area of 280 has would be occupied without any kind of services or community facilities.





### LOCALITY PLAN

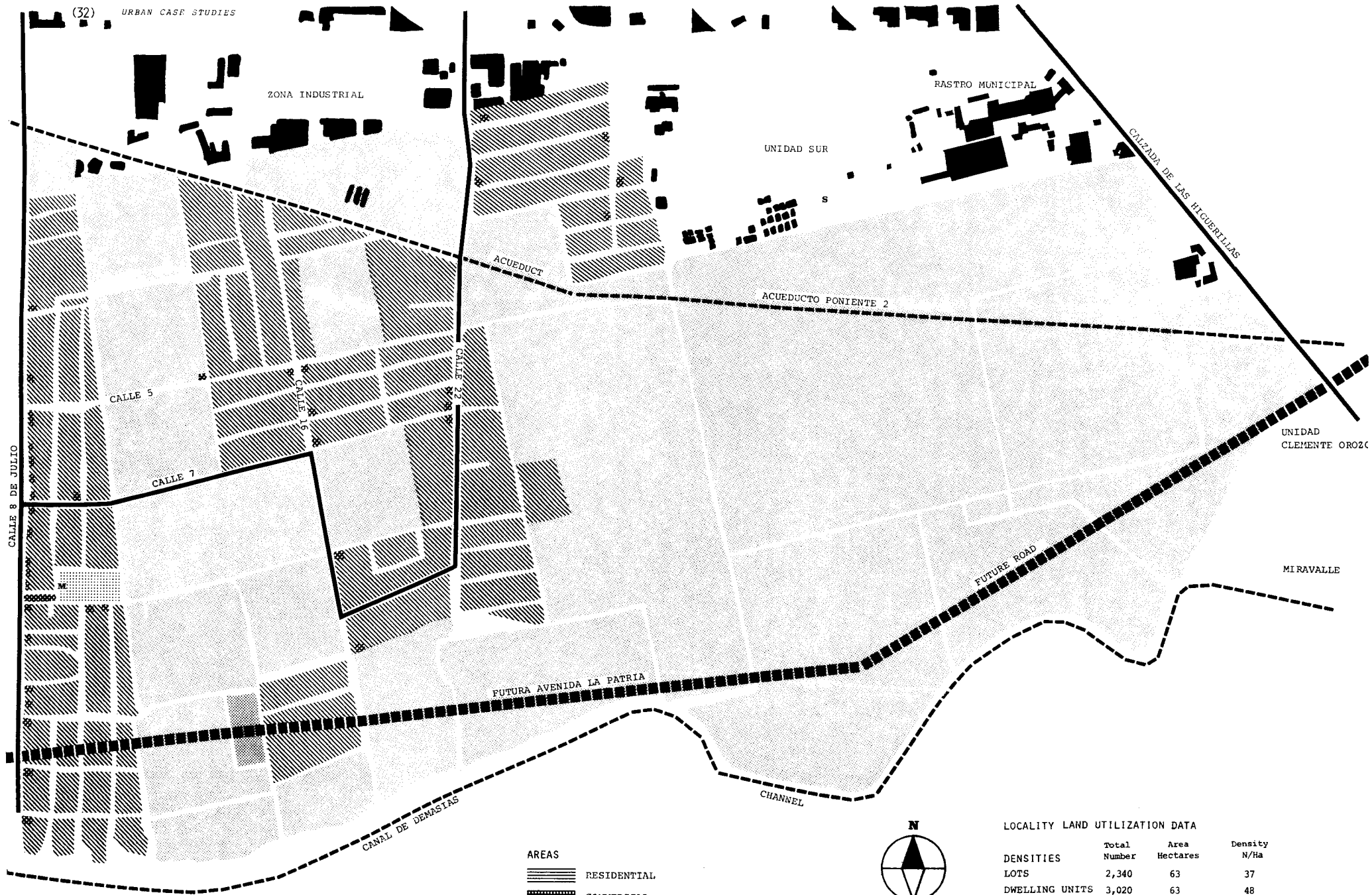
PHOTOGRAPHS, OPPOSITE PAGE:  
 COLONIA ECHEVERRIA: (top left) An illegal shanty tenement.  
 (top right) A canal borders the locality along the southern side.  
 (bottom) Two aspects of commercial activities: A corner stall and a street vendor for construction materials.






LAYOUT: The community layout has resulted from the regular subdivision of typical agricultural parcels of approximately 200m by 200m. Only the 22nd. Street is semi-diagonal due to the bus connection from one of the city bridges to the city center.




The most consolidated area is located to the west bounded by the 8 de Julio Avenue separating the community from a recently built speculative development.

To the north the new industrial area limits the site and offers some job opportunities. To the south is a water canal that is being used as a source of water even though the water has not been treated. Across this canal similar illegal developments have been appearing on the hilly areas of the Cerro del Cuatro Hill. The government land extends to the east towards the Calzada de la Higuierillas Avenue.

A new city avenue will cross the settlement. An acueduct crosses the site from east to west. The city slaughter house is located in the north-east corner. The site is flat with no special obstacles to urban development; it is expected that in four more years it will be completely saturated following the same layout.



- AREAS**
-  RESIDENTIAL
  -  COMMERCIAL
  -  INDUSTRIAL
  -  SEMI-PUBLIC
  -  AGRICULTURAL

- KEY**
-  School
  -  Market
  -  Bus



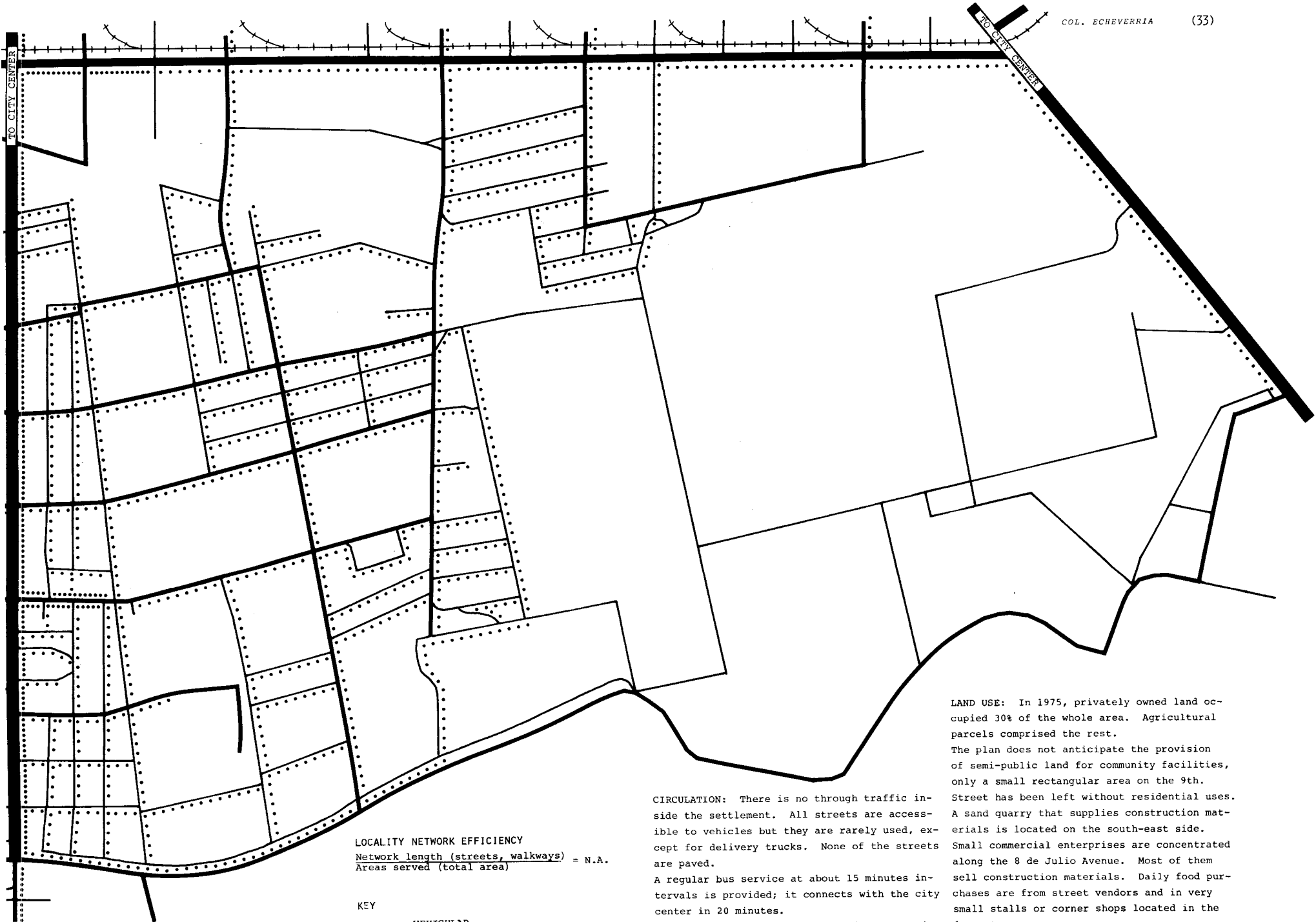
**LOCALITY LAND UTILIZATION DATA**

DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	2,340	63	37
DWELLING UNITS	3,020	63	48
PEOPLE	18,000	63	285

AREAS	Hectares	Percentages
TOTAL EJIDO LAND	290	100
INVADED (1975)	82	28

**LOCALITY LAND USE PATTERN**



LOCALITY NETWORK EFFICIENCY  
 $\frac{\text{Network length (streets, walkways)}}{\text{Areas served (total area)}} = \text{N.A.}$

KEY  
 ————— VEHICULAR  
 ..... PEDLSTRIAN

**LOCALITY CIRCULATION PATTERN**

CIRCULATION: There is no through traffic inside the settlement. All streets are accessible to vehicles but they are rarely used, except for delivery trucks. None of the streets are paved.

A regular bus service at about 15 minutes intervals is provided; it connects with the city center in 20 minutes.

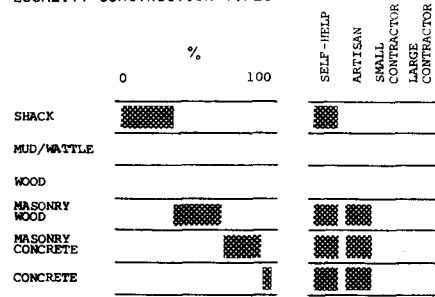
A rough stone road, the 8 de Julio Avenue, is the only relatively fast link with heavy traffic to and from the central areas. The Canal de Demasias road is mostly used by farm trucks.

LAND USE: In 1975, privately owned land occupied 30% of the whole area. Agricultural parcels comprised the rest.

The plan does not anticipate the provision of semi-public land for community facilities, only a small rectangular area on the 9th. Street has been left without residential uses. A sand quarry that supplies construction materials is located on the south-east side. Small commercial enterprises are concentrated along the 8 de Julio Avenue. Most of them sell construction materials. Daily food purchases are from street vendors and in very small stalls or corner shops located in the densest areas.

The adjacent Lomas de Polanco speculative development provides limited community facilities for some of the settlers.

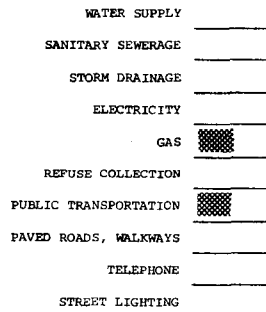
LOCALITY CONSTRUCTION TYPES



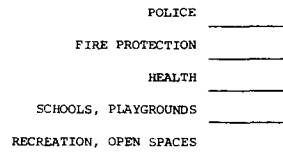
The chart shows (1) approximate percentage of each construction type within the total number of dwellings and (2) building group that generally produces each type.

Quality of information: Approximate

LOCALITY UTILITIES AND SERVICES



LOCALITY COMMUNITY FACILITIES



The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.

Quality of information: Accurate

SELECTED BLOCK

NETWORK EFFICIENCY

Network length (streets, walkways) = 229 m/Ha  
 Areas served (total area)



LOCALITY SEGMENT PLAN



1:2500



LOCALITY SEGMENT: This area of the locality was selected in order to show and differentiate four stages of development: untouched, cultivated agricultural land, and three distinct stages of block consolidation and lot subdivision.

At this scale the land subdivision at the expense of the agricultural land is easily observed. The relatively flat site with a 5% slope does not present any obstacles for the settlers on which to build.

BLOCK: The block is the result of the subdivision of an agricultural parcel of land, measuring approximately 200m by 200m, when divided into three parts of 60m by 200m. Lots of 30m by 10m placed back-to-back are used as the minimum average piece of land available.

The result of this is a high circulation per unit ratio, a situation that would eventually be negative when utility networks are to be installed. This could be remedied by encouraging the people to sell half of the lot to someone else. On the other hand, very wide streets of approximately 15m at 60m intervals will augment public land percentages to a considerable extent, increasing the cost of the utilities networks in both installation and maintenance costs. This could be solved by enclosing big block units with some sort of semi-private condominiums.

At this stage only one or two room dwelling units have been built.

A strong rural background is clearly noticed in the way they use the lots for cattle raising, poultry, crops, etc.

LOCALITY BLOCK LAND UTILIZATION DATA

DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	30	.80	37
DWELLING UNITS	38	.80	48
PEOPLE	228	.80	285

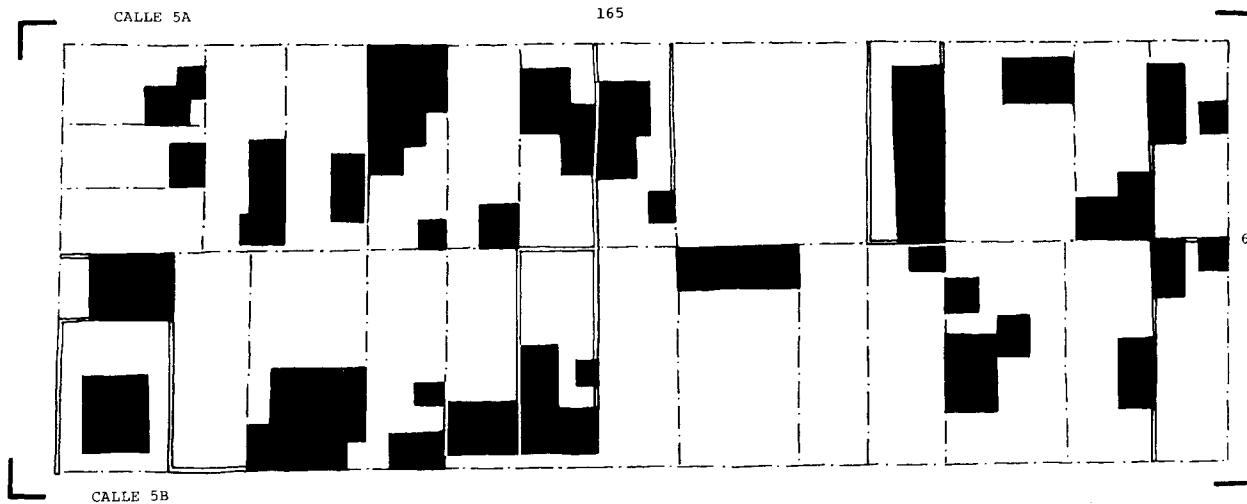
AREAS	Hectares	Percentages
PUBLIC (streets, walkways)	.24	23
PRIVATE (dwellings, shops, factories, lots)	.80	77
<b>TOTAL</b>	<b>1.04</b>	<b>100</b>

NETWORK EFFICIENCY

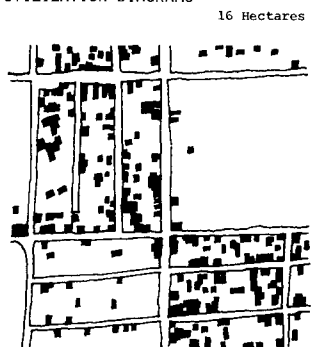
Network length (streets, walkways) / Areas served (total area) = 219 m/Ha

LOTS

Average area, dimensions = 266 , 10/25

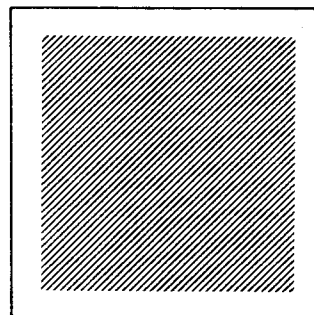


LAND UTILIZATION DIAGRAMS



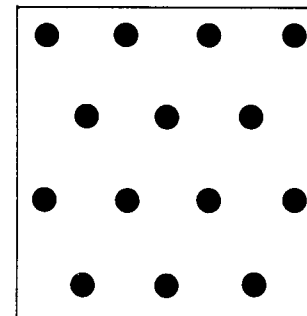
PATTERN  
 Public: streets/walkways (white box)  
 Private: lots dwellings (black box)

1 Hectare



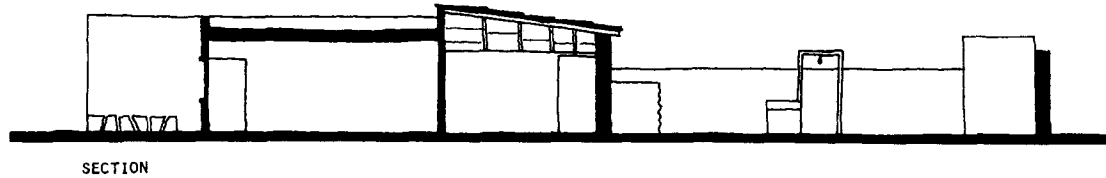
PERCENTAGES Streets/Walkways 23  
 Dwellings/Lots 77

1 Hectare

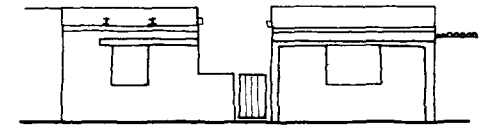


DENSITY Persons/Hectare 285  
 ● 20 Persons

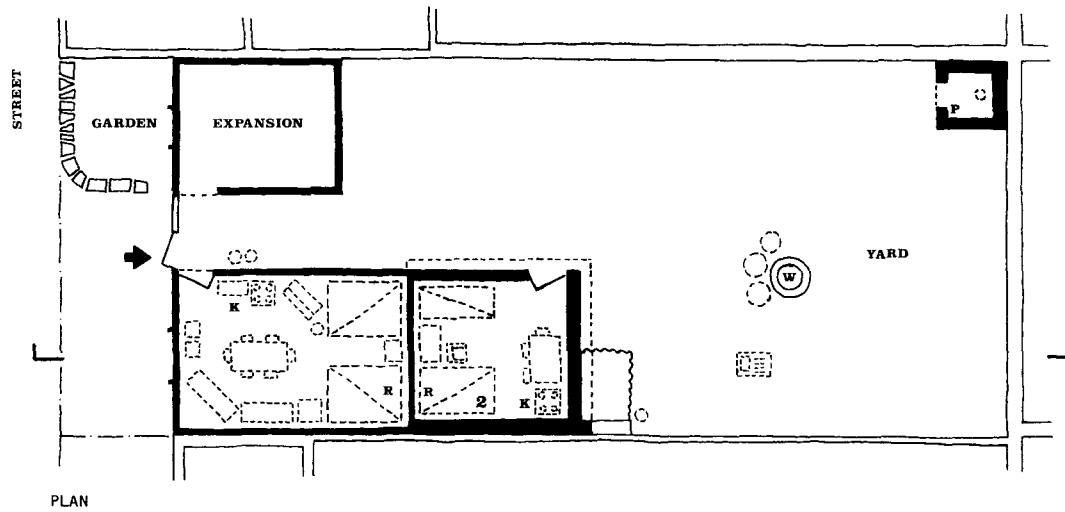
LOCALITY BLOCK LAND UTILIZATION



SECTION



ELEVATION



PLAN

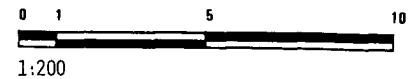
**POPULATION-INCOME:** The population in the Echeverria-Domingo Savio settlement belong to the very low and low income strata. Some of them are moderate low-income but do not reflect the typical characteristics of the community. Obviously none of the population is dealing with official housing agencies. From an occupation stand point, this is a very heterogenous population. There are municipal workers, street vendors, qualified factory workers, masons, drivers, mechanics, etc.

**KEY**

- R** Room (multi-use)
- K** Kitchen/Cooking Area
- L** Laundry
- W** Well
- P** Pit Letrine

**CASE STUDY SOURCES**

- Plan:* (approximate) CATASTRO Air Photographs and plans, 1975. Field survey 1976-1977. DPUEJ.
- Land Use Pattern:* (approximate) IBID
- Circulation Pattern:* (approximate) IBID
- Segment Plan:* (approximate) IBID
- Block Plan:* (accurate) IBID
- Typical Dwelling:* (accurate) Field survey 1976-1977.
- Physical Data:* (accurate) IBID
- Photographs:* The Author 1976-1977-1978.
- Other Information:* Field survey 1976-1977-1978. DPUEJ. ITESO 1974. H. Ayuntamiento de Guadalajara.



**TYPICAL DWELLING**

## PHYSICAL DATA

(related to dwelling and land)

## DWELLING UNIT

type: Room  
 area (sq m): 24  
 tenure: Legal Ownership

## LAND/LOT

utilization: Semi-Private  
 area (sq m): 250  
 tenure: Extra-Legal

## DWELLING

location: Inner Ring  
 type: Row/Grouped  
 number of floors: 1  
 utilization: Multiple  
 physical state: Fair

## DWELLING DEVELOPMENT

mode: Incremental  
 developer: Popular  
 builder: Aided Self-Help  
 construction type: Masonry  
 year of construction: 1973

## MATERIALS

foundation: Stone  
 floors: Dirt  
 walls: Brick  
 roof: Brick Vaults

## DWELLING FACILITIES

wc: Pit Letrine  
 shower: -  
 kitchen: 2  
 rooms: 2  
 other:

## SOCIO-ECONOMIC DATA

(related to user)

## GENERAL: SOCIAL

user's ethnic origin: Northern Mexican  
 place of birth: Amatlan, Nayarit  
 education level: Primary

## NUMBER OF USERS

married: 4  
 single: -  
 children: 8  
 total: 12

## MIGRATION PATTERN

number of moves: 2  
 rural - urban: 1969  
 urban - urban: 1973  
 urban - rural: -

why came to urban area: Employment

## GENERAL: ECONOMIC

user's income group: Low  
 employment: Bus Driver  
 distance to work: 2 Km  
 mode of travel: Public Transportation

## COSTS

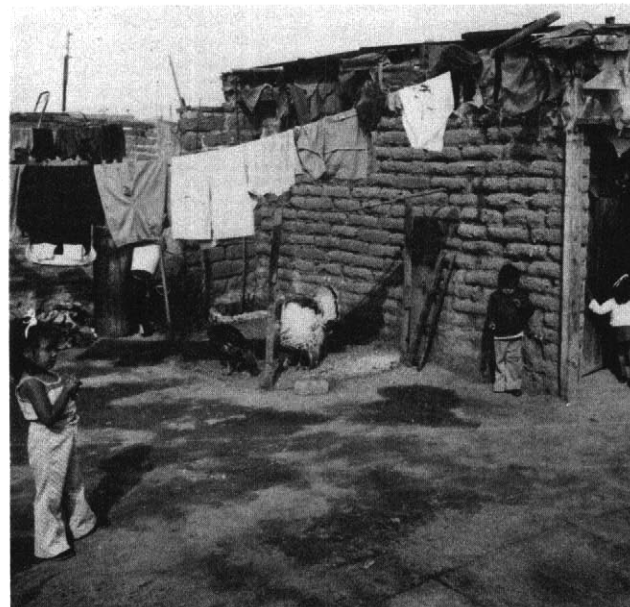
dwelling unit: \$ 1,200  
 land - market value: \$ 900

## DWELLING UNIT PAYMENTS

financing: Popular  
 rent/mortgage: None  
 % income for rent/mortgage: 0

## PHOTOGRAPHS:

COLONIA ECHEVERRIA: (top) A typical wide street. Note the construction materials in front of the houses.  
 (bottom left) An internal court shared by two families.  
 (bottom right) A dwelling unit with a brick-vault roof.

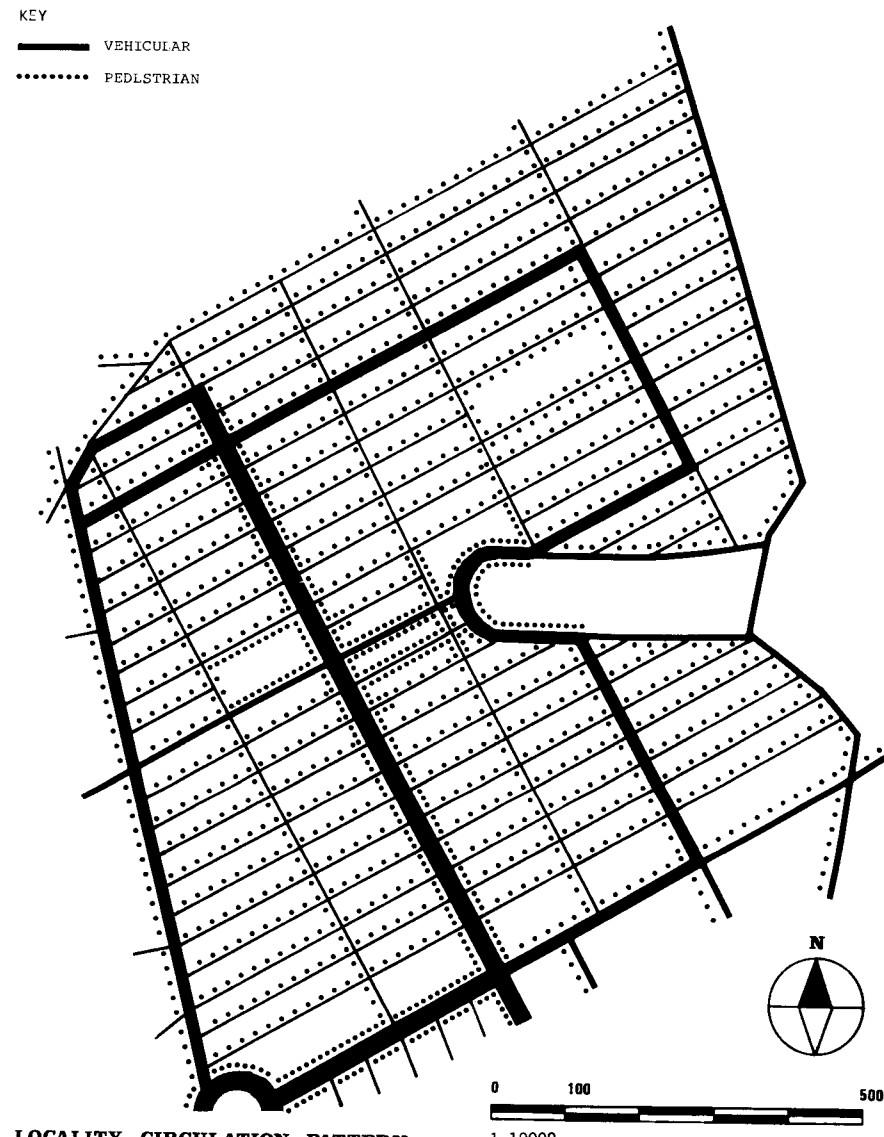






LOCALITY LAND USE PATTERN

1:10000



LOCALITY CIRCULATION PATTERN

1:10000

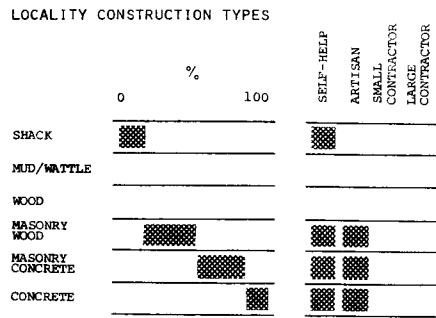
LOCALITY LAND UTILIZATION DATA

DENSITIES	Total	Area	Density
	Number	Hectares	N/Ha
LOTS	6,500	55	118
DWELLING UNITS	6,500	55	118
PEOPLE	39,000	55	710

AREAS	Hectares	Percentages
PUBLIC (streets, walkways, open spaces)	27	31
SEMI-PUBLIC (open spaces, schools, community centers)	6.5	7
PRIVATE (dwellings, shops, factories, lots)	55	62
<b>TOTAL</b>	<b>88.5</b>	<b>100</b>

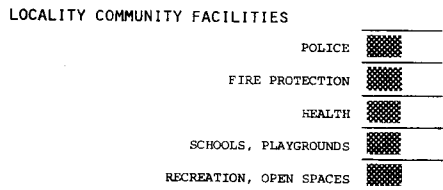
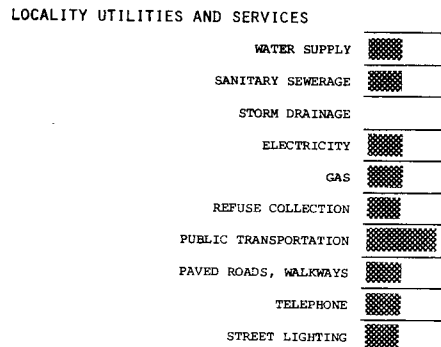
NETWORK EFFICIENCY

Network length (streets, walkways) = 287 m/Ha  
 Areas served (total area)



The chart shows (1) approximate percentage of each construction type within the total number of dwellings and (2) building group that generally produces each type.

Quality of information: Approximate



The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.

Quality of information: Accurate

[ ] SELECTED  
[ ] BLOCK

**NETWORK EFFICIENCY**  
 Network length (streets, walkways) = 325 m/Ha  
 Areas served (total area)



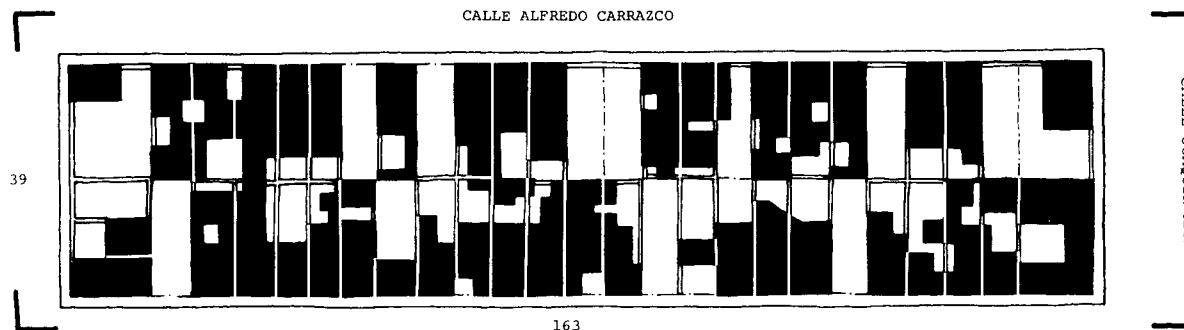
**LOCALITY SEGMENT PLAN**



1:2500



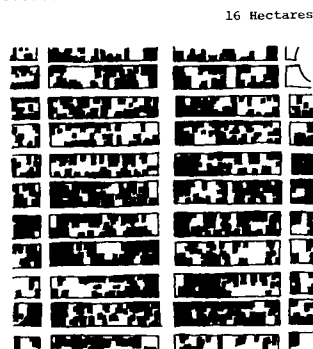
LOCALITY SEGMENT: The selected segment clearly shows how the layout relates poorly with the topography so that walking is very difficult, construction and maintenance of utilities are complicated, and lots increase construction costs for the users. The highly inefficient gridiron layout was intended to be improved by increasing block lengths but access, particularly walking, was made very difficult and inconvenient without really reducing network lengths or increasing private areas.



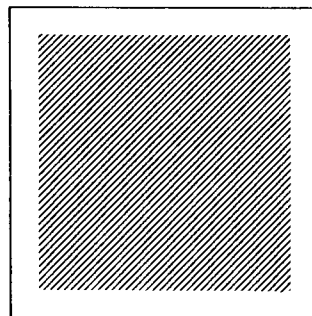
BLOCK: The block is representative of those found in most of the speculative developments built in the city since the 1960's. The original lot size was 10m by 15m that later was illegally subdivided by the developer into two of 5m by 15m. The size of the lots determined the network intervals which resulted in a high installation and maintenance costs. Most of the houses are being built by self-help. The building process is as follows:  
 1- Staking out the lots when people move in.  
 2- Building of a temporary shelter either on the front or in the back of the lot.  
 3- Construction of permanent rooms, generally of brick walls and vaults on concrete beams.  
 4- Building of a second floor to house another family.



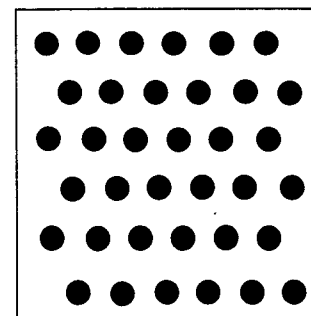
LAND UTILIZATION DIAGRAMS



16 Hectares



1 Hectare



1 Hectare

PATTERN  
 Public: streets, walkways   
 Private: lots dwellings

PERCENTAGES Streets/Walkways 33  
 Dwellings/Lots 67

DENSITY Persons/Hectare 710  
 20 Persons

LOCALITY BLOCK LAND UTILIZATION DATA

DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	52	.44	118
DWELLING UNITS	52	.44	118
PEOPLE	312	.44	710
AREAS		Hectares	Percentages
PUBLIC (streets, walkways,)		.21	33
PRIVATE (dwellings, shops, factories, lots)		.44	67
TOTAL		.65	100

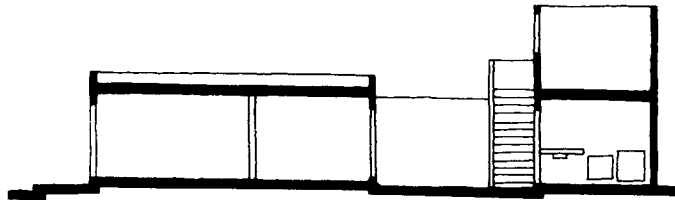
NETWORK EFFICIENCY

Network length (streets, walkways) = 300 m/Ha  
 Areas served (total area)

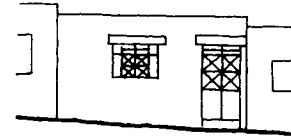
LOTS

Average area, dimensions = 85 , 5/15

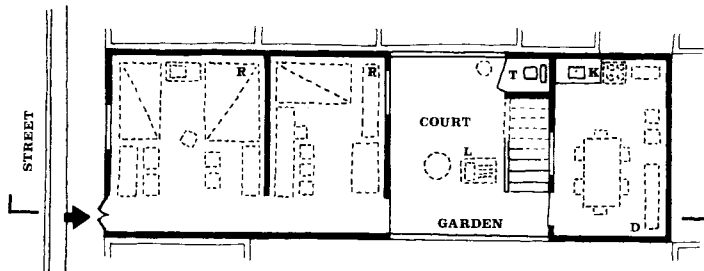
LOCALITY BLOCK LAND UTILIZATION



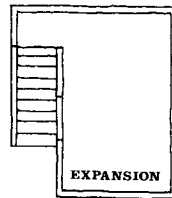
SECTION



ELEVATION



PLAN



KEY

- R Room (multi-use)
- D Dining/Eating Area
- K Kitchen/Cooking Area
- L Laundry
- T Toilet

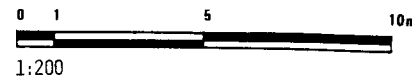
POPULATION-INCOME: The majority of the population is urban moderate-low and very low income. They are migrants from urban areas that have been living in the city for several years.

The population is employed in the services sector. They belong to unique social, ethnic, religious, and occupational backgrounds. The project will accommodate a population of 40,000 inhabitants.

TYPICAL DWELLING

CASE STUDY SOURCES

- Plan: (approximate) CATASTRO Air Photographs and plans, 1975. Field survey 1976-1977. DPUEJ.
- Land Use Pattern: (approximate) IBID
- Circulation Pattern: (approximate) IBID
- Segment Plan: (approximate) IBID
- Block Plan: (accurate) IBID
- Typical Dwelling: (accurate) Field survey 1976-1977.
- Physical Data: (accurate) IBID
- Photographs: The Author 1976-1977-1978.
- Other Information: Field survey 1976-1977-1978. DPUEJ. ITESO 1974. H. Ayuntamiento de Guadalajara.



**PHYSICAL DATA**

(related to dwelling and land)

**DWELLING UNIT**

type: House  
 area (sq m): 52  
 tenure: Legal Ownership

**LAND/LOT**

utilization: Private  
 area (sq m): 75  
 tenure: Legal Ownership

**DWELLING**

location: Periphery  
 type: Row/Grouped  
 number of floors: 1  
 utilization: Single  
 physical state: Fair

**DWELLING DEVELOPMENT**

mode: Incremental  
 developer: Popular  
 builder: Aided Self-Help  
 construction type: Masonry  
 year of construction: 1971

**MATERIALS**

foundation: stone  
 floors: Cement Tiles  
 walls: Brick  
 roof: Brick Vaults

**DWELLING FACILITIES**

wc: 1  
 shower: -  
 kitchen: 1  
 rooms: 3  
 other: -

**SOCIO-ECONOMIC DATA**

(related to user)

**GENERAL: SOCIAL**

user's ethnic origin: Northeastern Guadalajara  
 place of birth: Jalisco  
 education level: Primary

**NUMBER OF USERS**

married: 2  
 single: 1  
 children: -  
 total: 3

**MIGRATION PATTERN**

number of moves: 2  
 rural - urban: 1963  
 urban - urban: 1971  
 urban - rural: -

why came to urban area: Employment

**GENERAL: ECONOMIC**

user's income group: Mod. Low  
 employment: Police Officer  
 distance to work: 8 Km  
 mode of travel: Public Transportation

**COSTS**

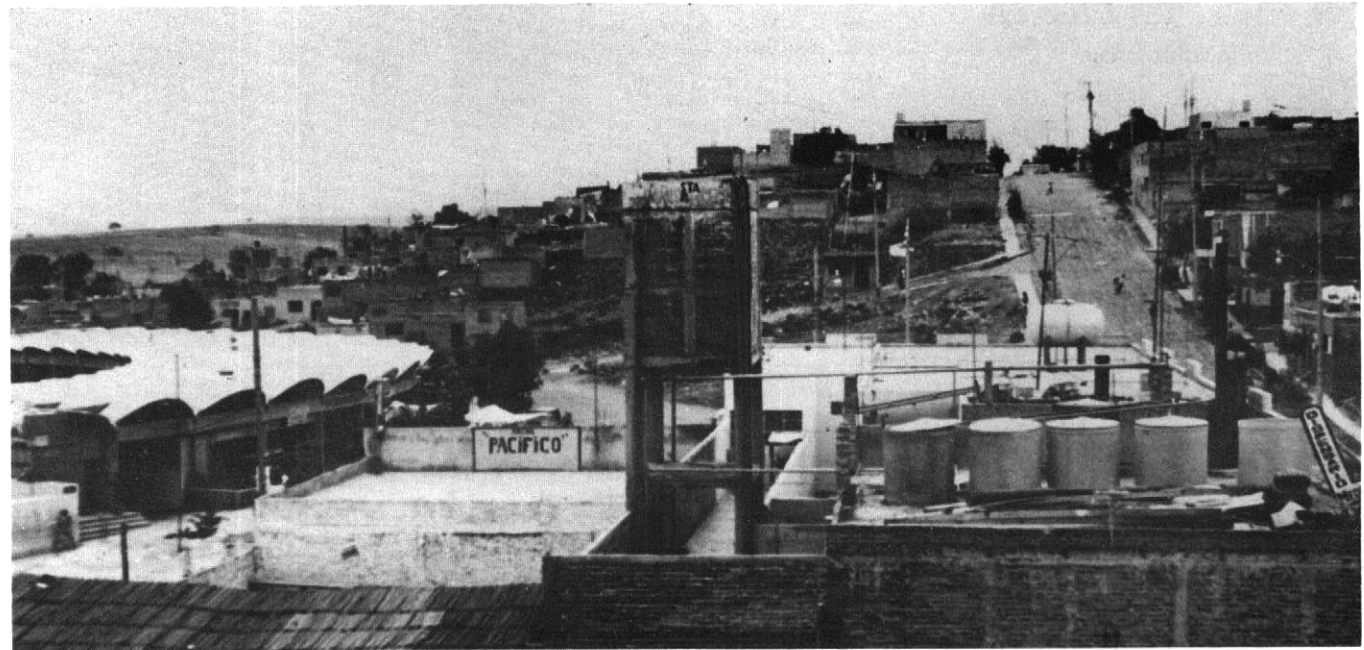
dwelling unit: \$ 2,500  
 land - market value: \$ 1,800

**DWELLING UNIT PAYMENTS**

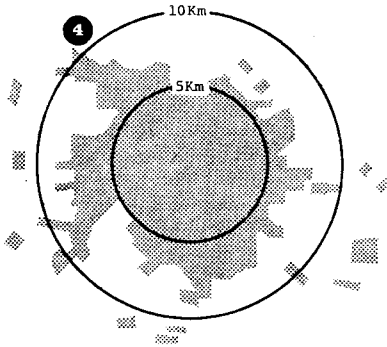
financing: Private  
 rent/mortgage: \$ 15 / Month  
 % income for rent/mortgage: 16 %

**PHOTOGRAPHS:**

SANTA CECILIA: (top) Southern section of the locality. Note the public market on the extreme left.  
 (bottom left) A characteristic street with rough stone paving on the steep slope.  
 (bottom right) A multi-use room in a single family dwelling.



# 4 LA TUZANIA PUBLIC HOUSING



**LOCATION:** The project is located 10 km north-west of the city center, 45 minutes away by bus. It is inside the Zapopan municipality boundaries and covers an area of approximately 60 has. Its boundaries on the north and west are agricultural land that will soon be converted to urban use, as in the case of the project. To the south is a speculative development, which is growing very rapidly. To the east across the peripheral road of the city, is a similar government project linked with La Tuzania by a pedestrian bridge. The site is approached by the Santa Margarita Avenue which connects the city center through the old town of Zapopan.

**ORIGINS:** La Tuzania is one of the largest public housing projects being developed in the city. It was begun in 1972 under the national programs of INFONAVIT (National Institute of Worker's Housing Funds) the largest public housing agency in Mexico. It is to be completed in 1978. The design norms are generally copied from developed nations but also complemented with "technocratic esthetic" criteria that ignores the local social conditions and the reasonable utilization of the scarce resources of the country. To date only four sections have been completed. This kind of instant project has been the most important government response to housing shortages. It focuses on the provision of finished houses for lower-middle and moderate-low income people.

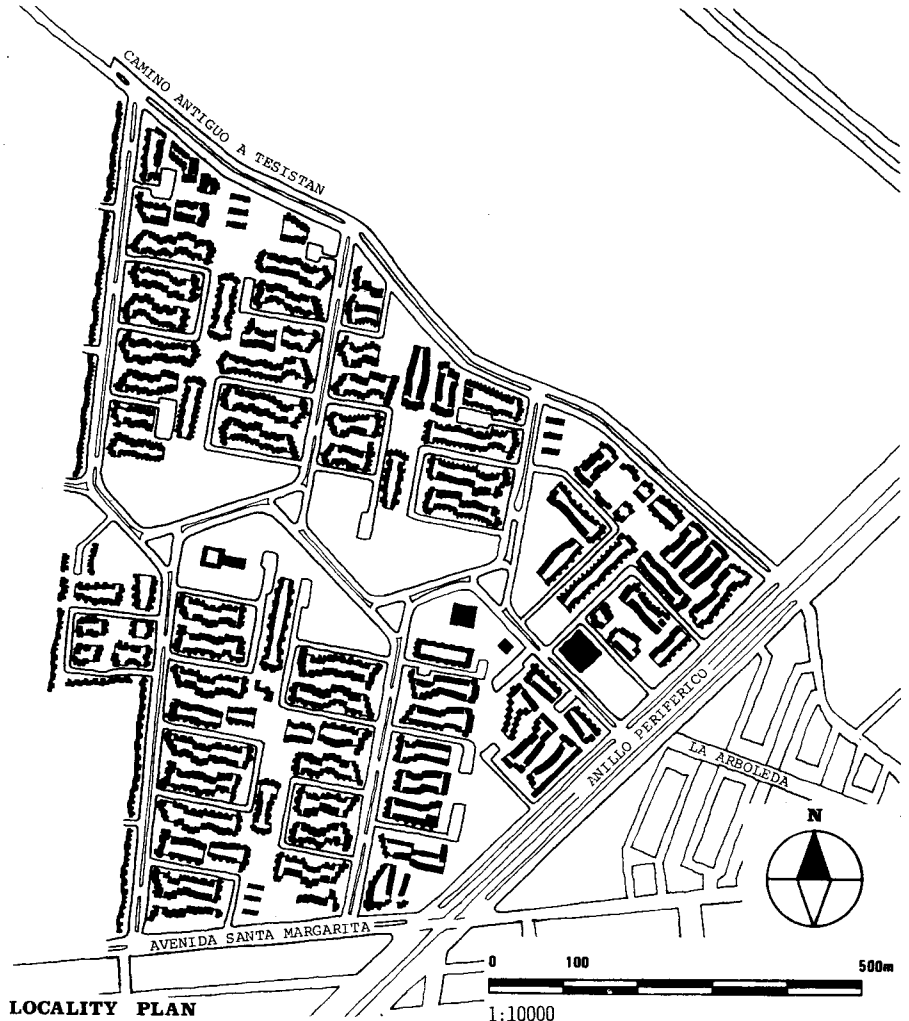
**LAYOUT:** The area of the city where the project is located, has been developed by private speculators since the completion of a city peripheral road about seven years ago. The site is relatively flat. The layout follows a graphic-design pattern with no attention to costs -- auto oriented streets even though there are no cars, American commercial center concept instead of public markets and small corner shops -- conditions that make an excessive waste of land and increase maintenance costs.

The lot size is the basic dimension for the intervals between public circulation networks, either vehicular or pedestrian. Since the lots are so small this dimension is determined by the size of two lots back-to-back which increases both the length and area of public circulation. This situation is aggravated by the extensive use of zig-zags in the layout.

The only physical constraint on the layout is a high tension line which crosses the site with a wide right-of-way which is designated as a public playground.

**LAND USE:** The site is entirely free of industry; no small stores or service shops are provided within the project. However some people use their front rooms as a store, service shop or kindergarden. Field observations indicate that local shops and street vendors are scattered throughout the area. Since some of the surrounding developments are comparatively deficient in community facilities, such as schools or playgrounds, over extended use of the project community facilities might be expected.

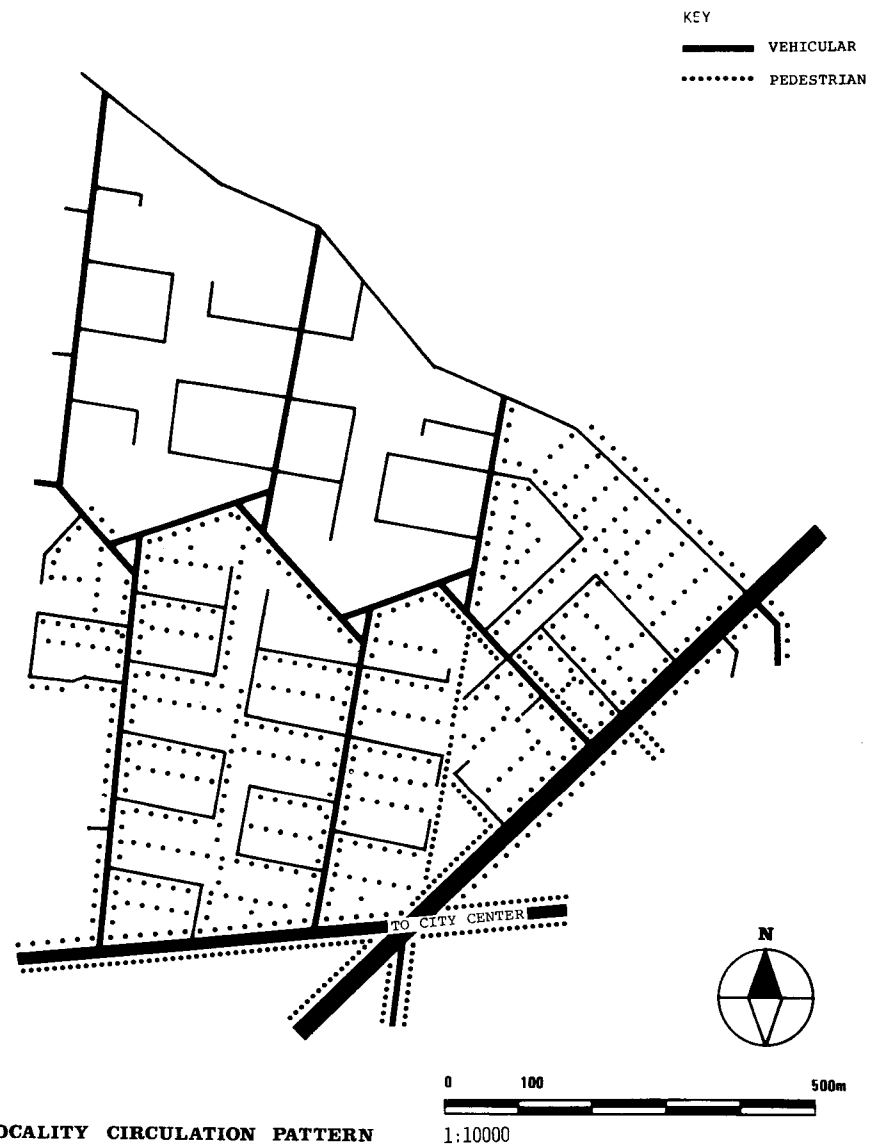
Very high percentages of public areas result in high installation and maintenance costs for the streets, public green areas, street playgrounds, walkways and public parking lots. The percentage of semipublic areas is very low. There is no clear definition of the utilization of open spaces in the whole project. Better land subdivision with specific designated uses would diminish the percentage of public land. All communal facilities are located along main vehicular avenues, though the percentage of people owning cars is very low. Private areas are used mainly for individual dwellings. Walk-up apartments were originally planned, but due to a recent change in the local INFONAVIT policies, this land will also be used for individual houses.



**LOCALITY PLAN**

**CIRCULATION:** The project is connected to the city by the Santa Margarita Avenue, which carries the main vehicular and pedestrian traffic through Zapopan. Is also a meshing boundary with a new speculative development, Santa Margarita, located to the south. A very wide right-of-way along the peripheral road bounds the site to the east. It takes all vehicular by-pass traffic from and to north-south highways, and acts as a barrier with a similar INFONAVIT project across this road. However, only two lanes have been paved. On the north, the old Tesistan road remains without significant traffic.

The project itself has five interior through avenues with an average width of 20m plus wide sidewalks of 2m. A central green strip divides them into two circulation lanes. The provision of parking facilities are useless at this stage, due to the absence of cars. All vehicular circulation streets are paved, parking areas are rough stones, walkways and playgrounds are cement blocks and grass respectively.



LOCALITY LAND USE PATTERN

LOCALITY CIRCULATION PATTERN

LOCALITY LAND UTILIZATION DATA

DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	3,530	29.4	120
DWELLING UNITS	3,530	29.4	120
PEOPLE	21,100	29.4	720

AREAS	Hectares	Percentages
PUBLIC (streets, walkways, open spaces)	27	45
SEMI-PUBLIC (open spaces, schools, community centers)	3.6	6
PRIVATE (dwellings, shops, factories, lots)	29.4	49
<b>TOTAL</b>	<b>60</b>	<b>100</b>

NETWORK EFFICIENCY

Network length (streets, walkways) = 336 m/Ha  
 Areas served (total area)

LOCALITY CONSTRUCTION TYPES

	0	%	100	SELF-HELP	ARTISAN	SMALL CONTRACTOR	LARGE CONTRACTOR
SHACK							
MUD/WATTLE							
WOOD							
MASONRY WOOD							
MASONRY CONCRETE							
CONCRETE							

The chart shows (1) approximate percentage of each construction type within the total number of dwellings and (2) building group that generally produces each type.

Quality of information: Accurate

LOCALITY UTILITIES AND SERVICES

WATER SUPPLY	
SANITARY SEWERAGE	
STORM DRAINAGE	
ELECTRICITY	
GAS	
REFUSE COLLECTION	
PUBLIC TRANSPORTATION	
PAVED ROADS, WALKWAYS	
TELEPHONE	
STREET LIGHTING	

LOCALITY COMMUNITY FACILITIES

POLICE	
FIRE PROTECTION	
HEALTH	
SCHOOLS, PLAYGROUNDS	
RECREATION, OPEN SPACES	

The chart illustrates the approximate availability of utilities, services, and community facilities at three levels: NONE, LIMITED, ADEQUATE.

Quality of information: Accurate

SELECTED BLOCK



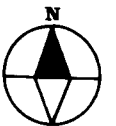
NETWORK EFFICIENCY

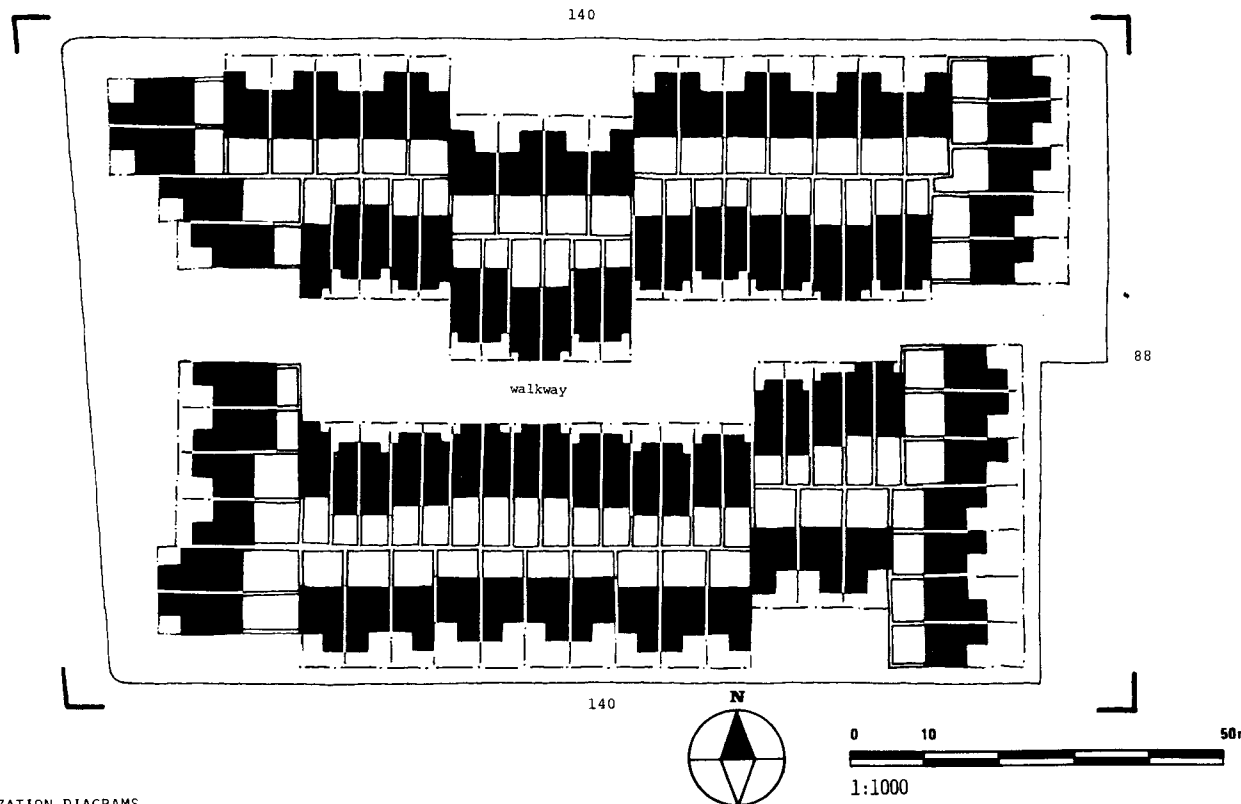
Network length (streets, walkways) = 331 m/Ha  
 Areas served (total area)

LOCALITY SEGMENT PLAN

0 50 100 150m

1:2500

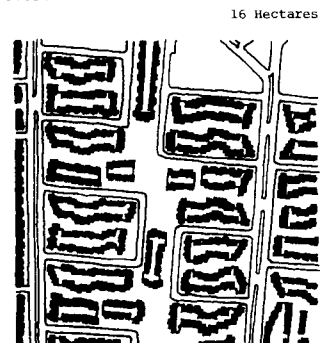




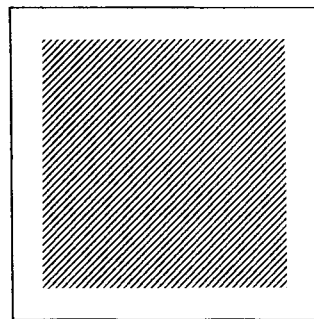
**LOCALITY SEGMENT:** The selected area shows how the pedestrian street squares and the parking lots are generated by the zig-zag in the lots. It also shows how this artificial design complicates network construction and public circulation wasting considerable area, that could otherwise be used for dwellings. This layout forces a costly infrastructure, and the excessive uncontrolled public areas put an additional burden on the dwellers resources. Secondary streets are 13m wide; walkways are 8m wide.

**BLOCK:** The typical block is approximately 1.2 ha, and is composed of two different kinds of lots: one of 96 m<sup>2</sup> (6 by 16), and the other of 128 m<sup>2</sup> (8 by 16). The latter is subdivided into two of 64 m<sup>2</sup> (4 by 16) along walkways and secondary streets. A walkway crosses the block connecting secondary streets with main avenues. The parking lots are located perpendicular to secondary streets. The block has different sidewalk widths according to the intended hierarchy of the street. It is very important to notice that all house set-backs are arbitrarily designed, provoking an artificial variety that complicates house expansion, house construction, and the user's control over their land and their environment. However, despite this, modifications and changes have been surprising.

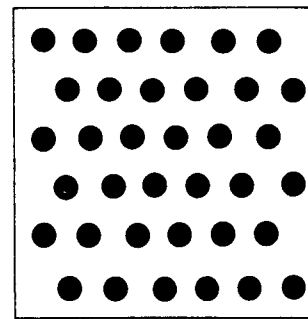
LAND UTILIZATION DIAGRAMS



16 Hectares



1 Hectare



1 Hectare

**PATTERN**  
 Public: streets/walkways   
 Private: lots dwellings

**PERCENTAGES**  
 Streets/Walkways 37  
 Dwellings/Lots 63

**DENSITY** Persons/Hectare 720  
 20 Persons

LOCALITY BLOCK LAND UTILIZATION DATA

DENSITIES	Total Number	Area Hectares	Density N/ha
LOTS	93	.77	120
DWELLING UNITS	93	.77	120
PEOPLE	558	.77	720

AREAS	Hectares	Percentages
PUBLIC (streets, walkways)	.43	37
PRIVATE (dwellings, shops, factories, lots)	.77	63
<b>TOTAL</b>	<b>1.2</b>	<b>100</b>

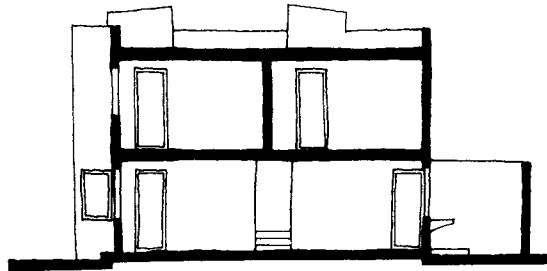
NETWORK EFFICIENCY

$\frac{\text{Network length (streets, walkways)}}{\text{Area served (total area)}} = 318 \text{ m/ha}$

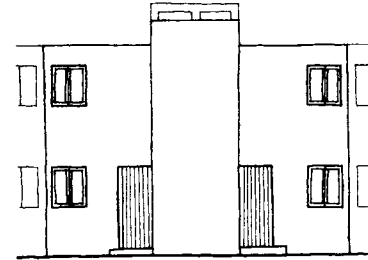
LOTS

Average area, dimensions = 83 , 4 / 16

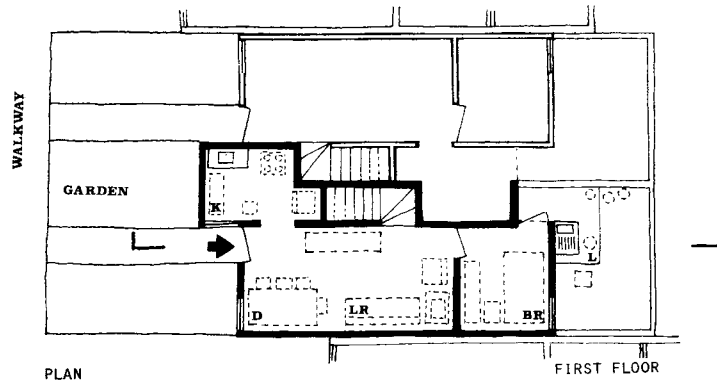
LOCALITY BLOCK LAND UTILIZATION



SECTION

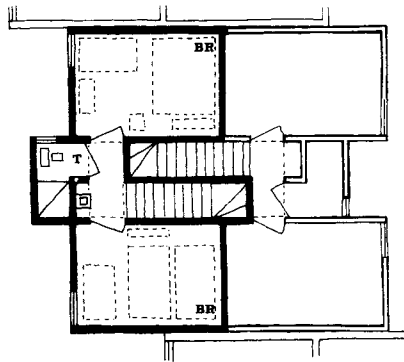


ELEVATION



PLAN

FIRST FLOOR

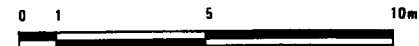


SECOND FLOOR

TYPICAL DWELLING

KEY

- LR Living Room
- D Dining/Eating Area
- BR Bedroom
- K Kitchen/Cooking Area
- T Toilet/Bathroom
- L Laundry



1:200

**POPULATION-INCOME:** The population target of the Institute is mainly stable workers earning 1 to 2.5 times the minimum official wage which is US \$ 1600 (1978). They generally work for big/medium scale commercial or industrial companies. For that reason they are considered financially stable enough for a long term commitment in buying high standard houses/services and facilities.

The project is heavily subsidized. People earning the same amount of money, without the privilege of being an INFONAVIT member, could never obtain comparable house/services/facilities in the housing city market.

The income selection criteria is based upon the minimum official wage earnings plus an employer subscription of the employee to the Institute, conditions that are far beyond the majority of the population. Moreover, these types of projects are politically manipulated as official propaganda seeking support for government policies. They are also presented as demagogic examples to the workers in order to alleviate to some extent those social pressures concerning the housing market. However, the limited or null effect of this projects in the overall context of low-income housing is clear.

CASE STUDY SOURCES

- Plan: (accurate) Jose Pliego Arch.
- CATASTRO Air photographs, 1975.
- Field survey 1976-1977.
- Land Use Pattern: (approximate) IBID
- Circulation Pattern: (approximate) IBID
- Segment Plan: (accurate) IBID
- Block Plan: (accurate) IBID
- Typical Dwelling: (accurate) IBID
- Physical Data: (accurate) Field survey 1976-1977
- Photographs: The Author 1976-1977-1978.
- Other Information: Field survey 1976-1977-1978. Jose Pliego Arch. "Elementary Evaluation of Five Projects Layout" USDP, 1976.

## PHYSICAL DATA

(related to dwelling and land)

## DWELLING UNIT

type: House  
 area (sq m): 71  
 tenure: Legal Ownership

## LAND/LOT

utilization: Private  
 area (sq m): 64  
 tenure: Legal Ownership

## DWELLING

location: Periphery  
 type: Row/Grouped  
 number of floors: 2  
 utilization: Single  
 physical state: Good

## DWELLING DEVELOPMENT

mode: Instant  
 developer: Public  
 builder: Large Contractor  
 construction type: Masonry  
 year of construction: 1975

## MATERIALS

foundation: Stone  
 floors: Cement  
 walls: Brick  
 roof: Brick Vault

## DWELLING FACILITIES

wc: 1  
 shower: 1  
 kitchen: 1  
 rooms: 4  
 other: Service Patio

## SOCIO-ECONOMIC DATA

(related to user)

## GENERAL: SOCIAL

user's ethnic origin: Eastern Guadalajara  
 place of birth: Jalisco  
 education level: Primary

## NUMBER OF USERS

married: 2  
 single: -  
 children: 6  
 total: 8

## MIGRATION PATTERN

number of moves: 3  
 rural - urban: 1967  
 urban - urban: 1972  
 urban - rural: 1975

why came to urban area: Employment

## GENERAL: ECONOMIC

user's income group: Middle  
 employment: Retail Store Employee  
 distance to work: 15 Km  
 mode of travel: Public Transportation

## COSTS

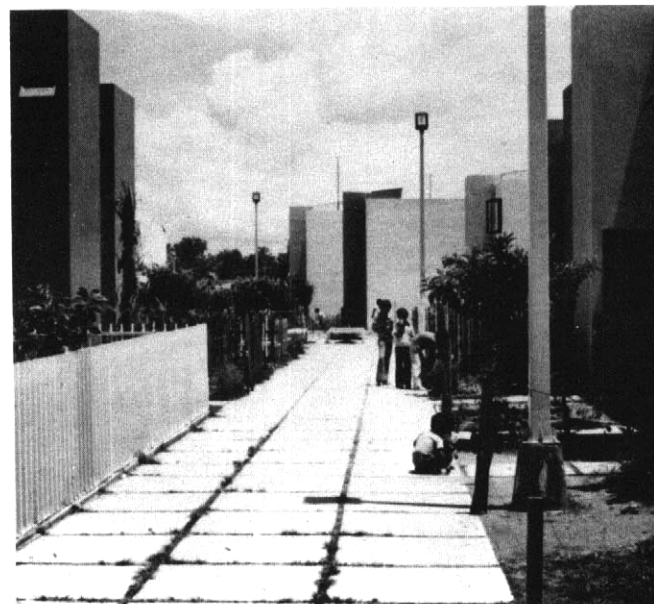
dwelling unit: \$ 4,000  
 land - market value: \$ 1,800

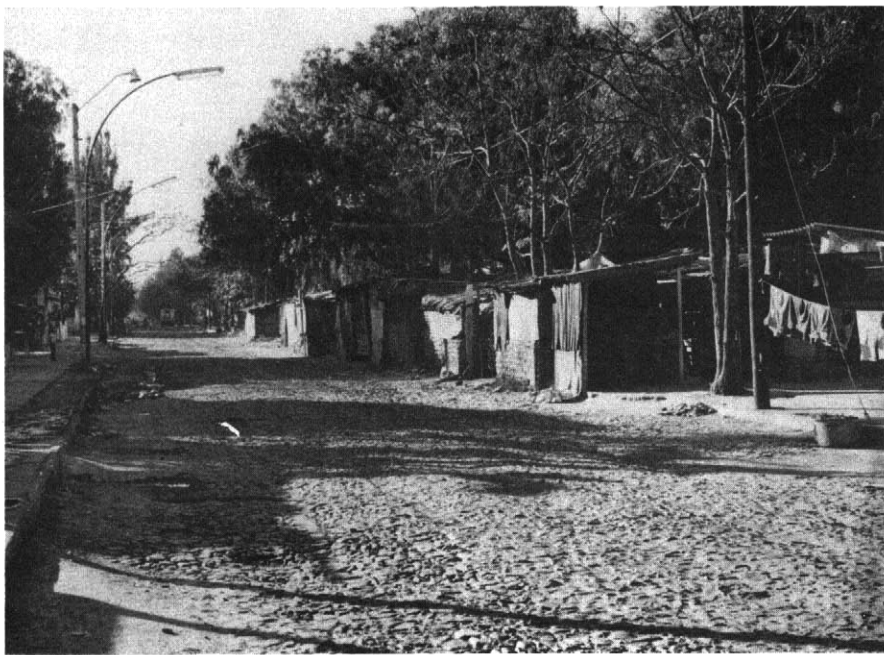
## DWELLING UNIT PAYMENTS

financing: Public  
 rent/mortgage: \$ 16 / Month  
 % income for rent/mortgage: 13 %

## PHOTOGRAPHS:

LA TUZANIA: (top) A local street with parking lots on both sides.  
 (bottom left) Pedestrian access.  
 (bottom right) Dining-living room in a single family dwelling.





PHOTOGRAPHS:  
GUADALAJARA: (top left) A public market invading the street in the speculative development of Polanco. (top right) A popular weekly market (tianguis) in the old speculative development of San Juan Bosco area. (photograph, Gabriel Casillas). (bottom left) A court in a dwelling with a well and storage tanks in the Echeverria area. (bottom right) A girl doing the laundry in the illegal development of Balcones del Cuatro.

## PROPOSED PROJECT

This project is a preliminary design for the development of a residential community in the City of Guadalajara.

The project derives from an initiative by the state government that deals with the provision of a site and attendant services for the low-income through a new government agency.

A first preliminary design was already prepared by the Department of Urban Planning (Guadalajara, Winter 1977), but an evaluation presented by the author in January of 1978, showed severe design shortcomings. Based on this evaluation an alternative design was suggested.

The proposal developed here is a further maturation of the alternative design and represents a brief outline for the preparation of the final project.

The project incorporates several distinctive characteristics: "condominium" ownership is provided with variable lot sizes that offer more flexibility in the use of the layout, maximizing user's responsibility and minimizing government costs in implementation, maintenance and operation. In housing, dwellings are provided that can be progressively expanded, minimizing initial investment costs by the users and the government. Different levels of services are provided that are associated with the different housing options resulting in a positive mixture of incomes.

## SITE DATA

**LOCATION:** The site lies in the municipalities of Guadalajara and Zapopan, approximately 8 km southwest from the city center and 3.5 km from an industrial zone.

**APPROACHES/ACCESSES:** The main route of approach is Colon Avenue running north-south on the west side of the site which leads to the city center. A planned peripheral avenue, La Patria, will run parallel to the northern side of the site. Both avenues are expected to be vehicular dominant routes serving large sections of the city. Both provide linear access on the north and east sides of the site.

**TRANSPORTATION:** Buses are already serving the illegal subdivisions .5 km to the north, this service could easily be extended.

### SIZE/SHAPE

Gross area/Usable area of the site: 117 hectares

**TOPOGRAPHY/NATURAL FEATURES/SOIL:** The site has no special features. The natural drainage of the site runs from south to north with an average slope of less than 5%. The soil is seasonal agriculture land with underlying strata of well-graded sand and gravelly sands. Bearing capacity of the well-graded sand is 1.5 kg/cm<sup>2</sup> which is adequate for both dwellings and utility networks.

**ZONING RESTRICTIONS AND REGULATIONS:** The site is zoned for residential purposes. There are both urbanization and construction codes from the two municipalities where the site is located. Special administrative agreement must be worked out for proper development. The proposed project considers only the Guadalajara codes.

**BOUNDARIES:** To the east and to the north Colon Avenue and future La Patria Avenue separate the site from adjacent rapidly growing illegal subdivisions. To the west government land "ejidos" limits the site. To the south is a new high-income residential area on the surrounding steep slopes. Very eroded slope areas limit the site from this high-income area towards the Colon Avenue.

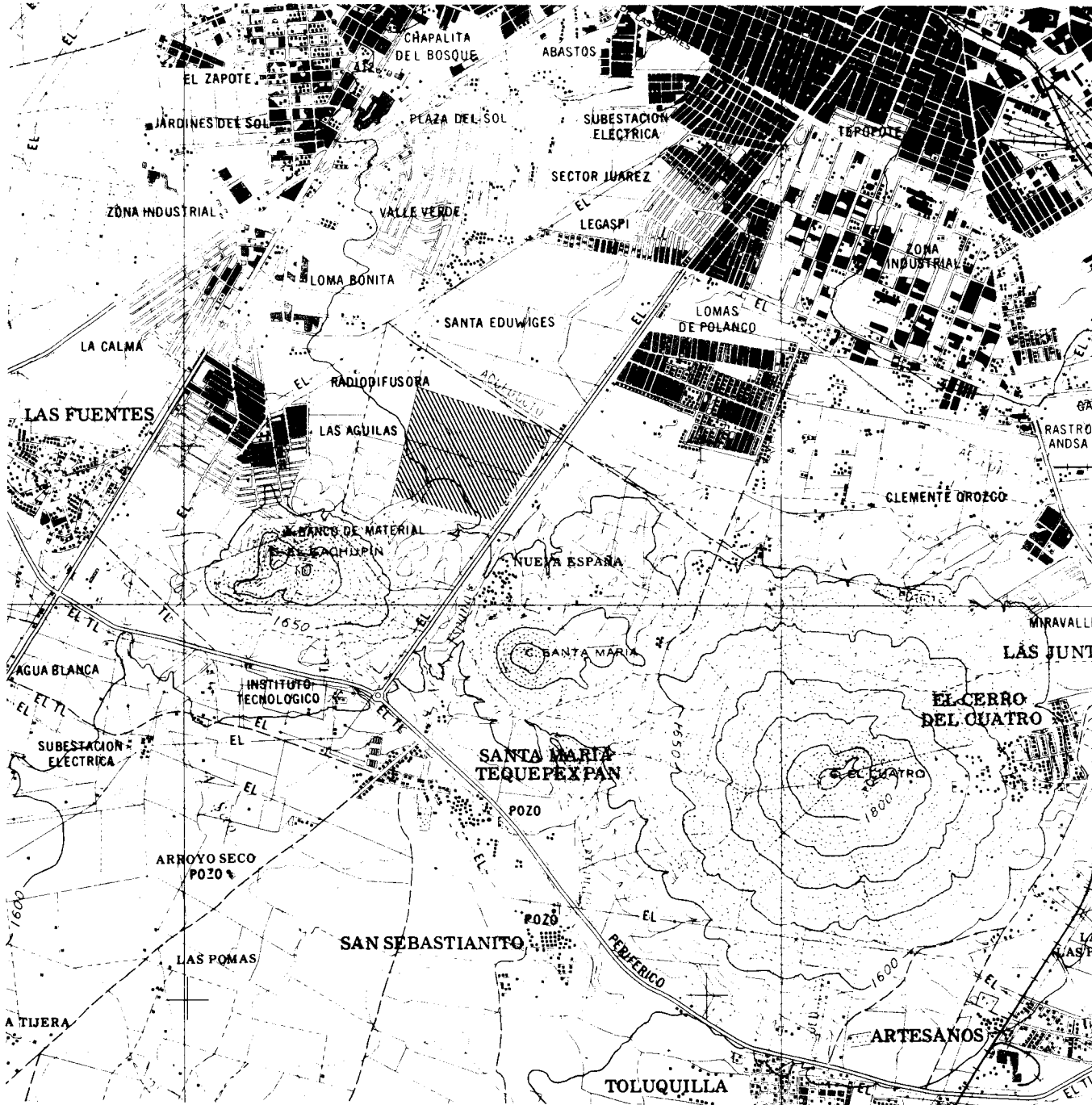
**LAND TENURE/LAND COST/INCOME PATTERN:** All of the land is private property owned by the state government. Government land "ejidos" surrounds the site on three sides. These areas are rapidly being illegally settled by low-income people. To the south there is private property being developed for high-income people. Land is valued at US \$ 1.80/m<sup>2</sup>, compared to \$ 80.00/m<sup>2</sup> in the inner ring. The site has no infrastructure.

**INFRASTRUCTURE/COMMUNITY FACILITIES:** A high tension line runs along Colon Avenue and will provide service to the site. Water will be provided from a projected system that will also serve several communities around the site. Main sewage and storm drainage network will be extended 2 km south from the Lomas de Polanco speculative development. There are no existing community facilities and all will have to be provided within the project.

### OTHER FACTORS:

**Views:** The site has a good view of the city.

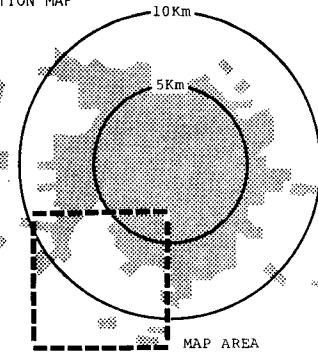
**Dust/odors/dirt/disturbances:** The industrial zone when saturated might represent a long-term problem with dust, odors and smoke. Especially during the rainy season when the wind blows mostly east-west. Noise from the Colon and La Patria Avenues may become a nuisance.



**SOUTHWESTERN METROPOLITAN AREA**

SITE

LOCATION MAP



SITE LOCATION MAP

CETENAL (Comision de Estudios del Territorio Nacional)



1: 50000

**BASIC DATA**

AREA OF THE SITE: 117 hectares

AREA USED FOR HOUSING: 73 hectares

AREA FOR FUTURE COMMERCIAL/INDUSTRIAL USE: 28 hectares

AREA DONATED FOR MAIN CITY ARTERIES: 16 hectares

SITE CONDITIONS: Normal

APPROXIMATE POPULATION: 25,000

TARGET INCOME GROUP: From very-low to middle income  
yearly incomes range from US  
\$ 400.00 to \$ 3,000.00

NUMBER OF DWELLING UNITS/LOTS: 4,180

APPROXIMATE DENSITY: 731 persons per hectare

DEVELOPMENT: Progressive/instant

LEVEL OF SERVICES: Minimum progressive/standard

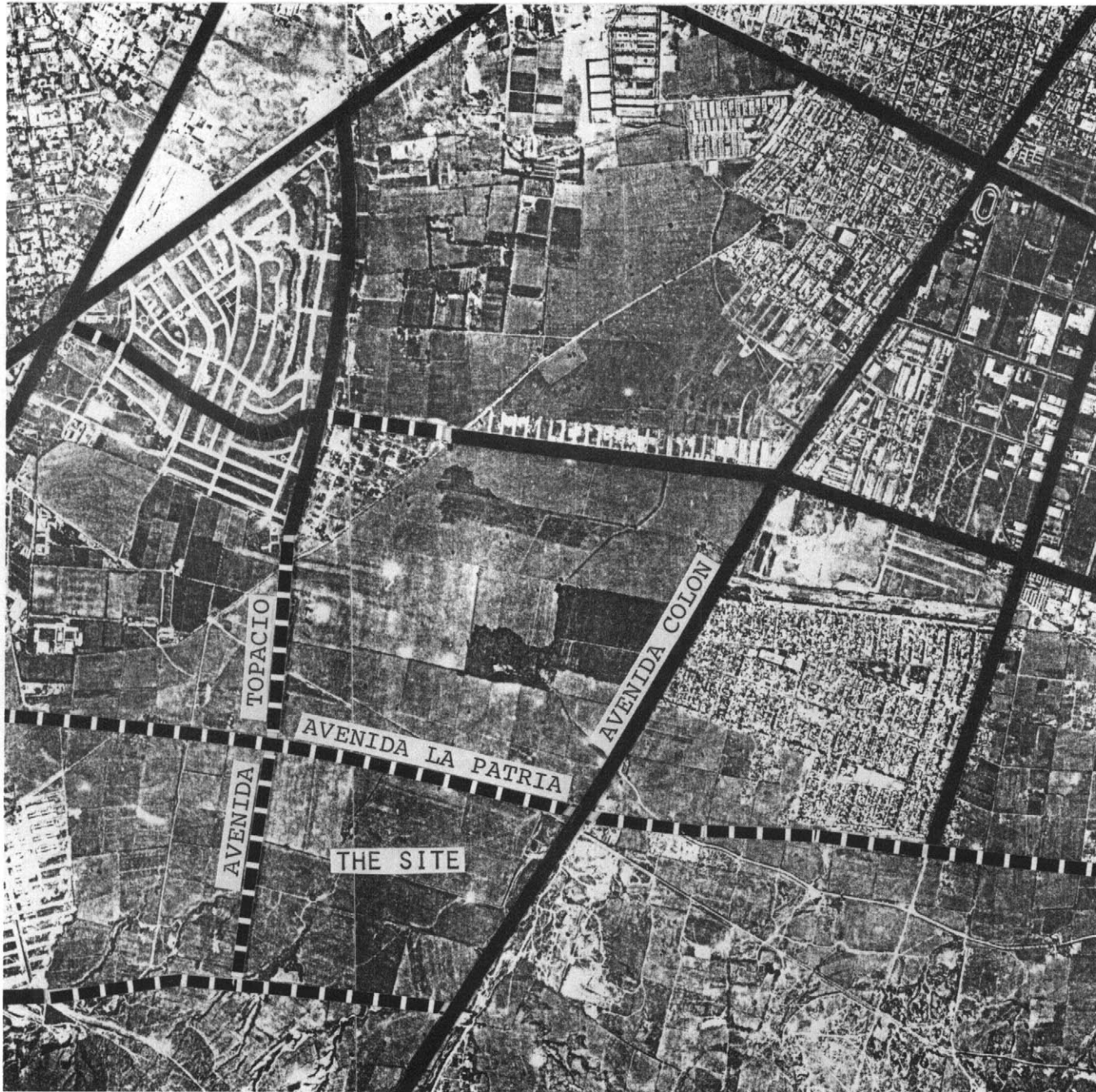
SUPPORTING COMMUNITY FACILITIES: 4, 18-classroom primary schools; 1, 12-classroom secondary school; 1 locality center with public market, post office, police, civic center, auditorium, movie theater; 1 day care nursery/clinic/kindergarten; space for one church.

**COST DATA**

DWELLING OPTIONS	N° of units	Cost per unit	Total cost
4.5x15 progressive services lots	1,633	337.50	551,137.50
4.5x15 standard services lots	803	877.50	704,632.50
6x18 standard services lots	832	1,400.00	1,164,800.00
Expandable apartment type A	300	3,400.00	1,020,000.00
Expandable apartment type B	116	4,450.00	516,200.00
7.5x24 commercial lots	254	4,680.00	1,187,200.00
4.5x18 expandable house	104	5,250.00	546,000.00
6x18 expandable house	72	7,070.00	509,040.00
Sub Total			6,200,530.00
Lots on corners	54	4,000.00	216,000.00
Arcade corner houses	12	11,760.00	141,120.00
Access stairs	104	840.00	87,360.00
Sub Total			6,645,010.00
Community facilities			1,661,252.50
Land cost			2,300,000.00
<b>TOTAL</b>			<b>10,606,262.50</b>



All cost are in US Dollars  
1 Dollar = 22.60 Mexican Pesos

Note: The total cost per hectare of public housing projects recently built in the city is - as compared to this project - two times greater.



**AERIAL SITE PHOTOGRAPH**

**KEY**

-  MAIN EXISTING CIRCULATION
-  PROJECTED CIRCULATION

AERIAL PHOTOGRAPH:  
 SOUTHWESTERN METROPOLITAN AREA: Note the main city arteries, projected arteries and the relation of the site with the circulation network.  
 The photograph was taken in 1970 by CETENAL. Today the north, east, and west borders of the site have been illegally occupied by low income settlers. Towards the southern fringe of the site a high income development is under construction.



1:25000

## PLANNING POLICIES/GOALS

The proposed planning policies/goals are as follows:

### PRIMARY USE: RESIDENTIAL

The primary use of the site will be residential. However land will be reserved for future anticipated commercial/industrial demand, especially along the main circulation arteries. The profits generated on this land will be used to finance the last stages of the project. Community facilities will be built incrementally according to the pace of development.

### TARGET INCOME GROUPS: FROM VERY LOW TO MIDDLE INCOME

The development will aim toward the following income groups:

Group	% of Pop.	Year.inc.	25% hous.	Monthly P.
Very-low	12	\$ 400.00	\$ 100.00	\$ 8.30
Low	16	\$ 850.00	\$ 212.00	\$ 17.70
Mod-low	22	\$ 1,600.00	\$ 400.00	\$ 35.00
Low-mid.	12	\$ 2,500.00	\$ 625.00	\$ 52.00
Middle	13	\$ 3,000.00	\$ 750.00	\$ 63.00

The range of incomes goes from 1/4 to 2 times the minimum official wage that in 1978 was \$ 1,600.00 per year.

TENURE: CONDOMINIUM OWNERSHIP 90%  
PRIVATE OWNERSHIP 10%

### INTENSITY OF LAND USE: HIGH DENSITIES

Similar densities to public housing and private speculative developments presently found in the city, approximately 700 persons/hectare, net density.

### FINANCING: PUBLIC/PRIVATE/POPULAR

Public funds will be used to buy the land and prepare the project. Private funds will finance the initial stage of construction. The project will be promoted and sold before completion. With this income the project will be completed.

### UTILITIES/CONNECTIONS TO EXISTING SYSTEMS:

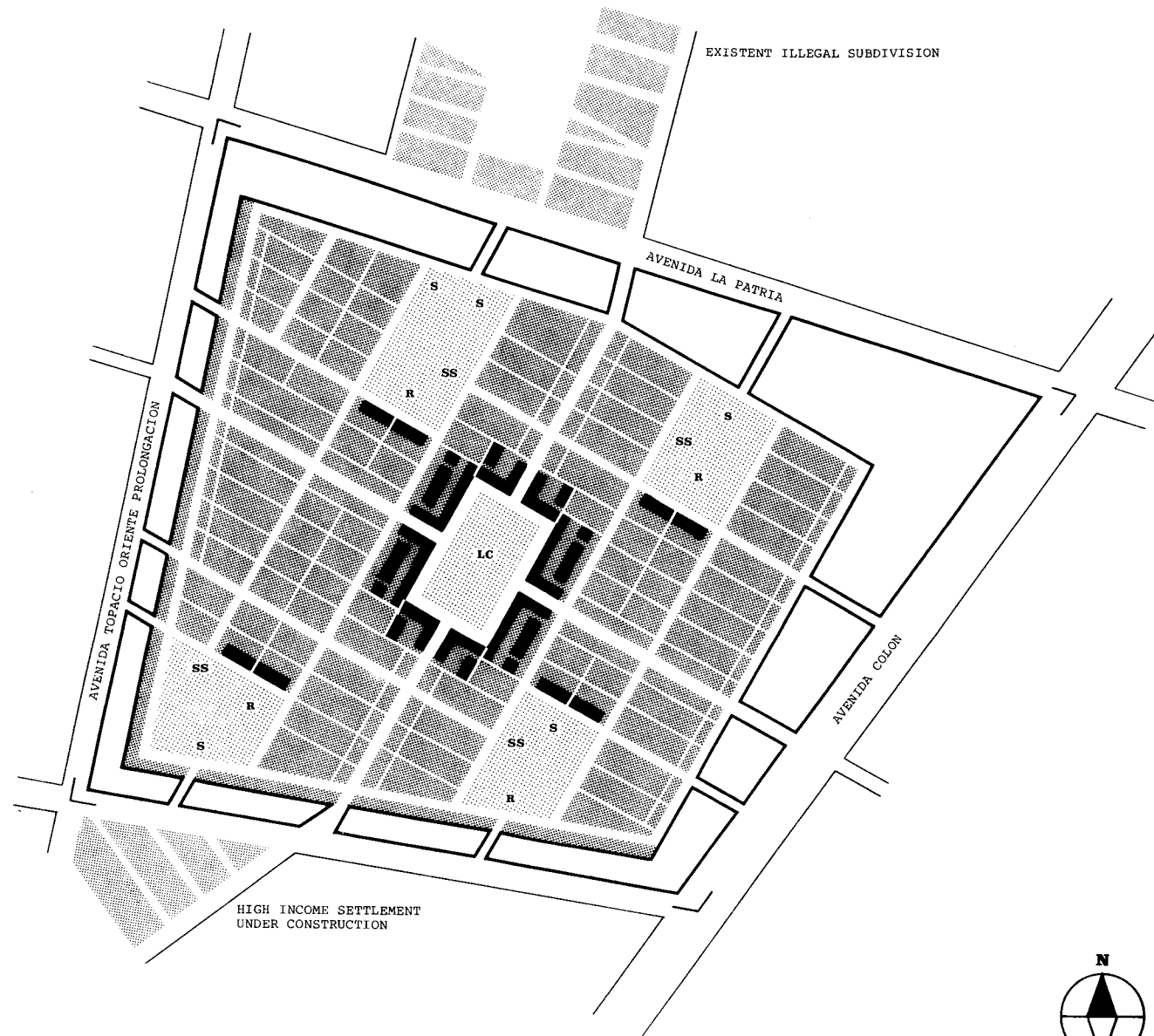
Water will be connected to the planned system of Nueva Espana. Sewer network will be connected to the main collector that runs along Colon Avenue. Electricity will be connected to the high tension line that parallels the eastern side of the site. Main lines will be installed instantly; secondary lines for progressively developed lots will be provided when requested by the users.

### SERVICES:

Public transport will be provided initially from and to Colon Avenue. All other services will be provided according to the standard procedures in the city.

### DEVELOPMENT MODE: PROGRESSIVE/INSTANT

40% of the lots will not have full services at the beginning. Dwelling units will be progressively expanded. 85% of the dwelling units, including the 40% above, will be built by self-help/aided self-help with limited technical assistance from the government.



KEY

- Public: streets
- Semi-Public:
- Private Semi-Private: dwellings
- lots cluster courts
- Perimetral speculative land

- LC LOCALITY CENTER
- S School
- Ch Church
- R Recreation
- H Health
- PO Post Office
- SS Social Services
- M Market
- Pk Parking
- P Police

LAND UTILIZATION DATA

DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	3963	34	115
DWELLING UNITS	4180	34	121
PEOPLE	25080	34	731

AREAS	Hectares	Percentages
PUBLIC (streets, walkways, open spaces)	15	21
SEMI-PUBLIC (open spaces, schools, community centers)	12	16
PRIVATE (dwellings, shops, factories, lots)	34	47
SEMI-PRIVATE (cluster courts)	12	16
SUB TOTAL	73	100

TOTAL LAND UTILIZATION DATA

SUB TOTAL	73 Has.
PERIMETRAL SPECULATIVE LAND	28 Has.
PERIMETRAL AVENUES	16 Has.
TOTAL	117 Has.

DWELLING/LOT TYPES

	Number	Percentage
1 4.5x15 Progressive services lot	1633	39
2 4.5x15 Standard services lot	803	19
3 6x18 Standard services lot	832	20
4 Apartment A	300	7
5 Apartment B	116	3
6 7.5x24 Commercial lot	254	6
7 4.5x18 House	104	2.5
8 6x18 House	72	1.5
Arcade corners house	12	.5
Big lots on street corners	54	1.5
TOTAL	4180	100



1:10000

PLAN OF LAND USE/SUBDIVISION

## LAND SUBDIVISION

The proposed project contemplates the following policies for land subdivision:

Minimization of public land for circulation, to reduce length of public infrastructure, (water, electricity, sewerage, storm drainage, street lights), in order to reduce construction costs, simplify maintenance and concentrate services, (police, garbage collection, transportation, etc.).

It intends to maximize user control, responsibility, initiative and participation, in order to achieve sound social benefits that can not be economically quantified.

Application of these policies are as follows:

As to the layout, the design follows two basic principles that regulate public circulation, and the size of the neighbourhood.

The block is small enough to facilitate circulation but still large enough to minimize public areas.

The neighbourhood is small enough to facilitate pedestrian circulation for daily movements, and large enough to allow at least one primary school.

As to the block, condominium ownership is proposed.

This system of direct ownership of a single unit in a multi-unit structure, increases the flexibility of the layout, permits the progressive development of the project, encourages the control, responsibility, initiative and participation of the users.

The same patterns of development can be found in old settlements everywhere in the country; they provide an adequate environment for the further consolidation of the community.

PROPOSED PROJECT CIRCULATION

STREET TYPE	LENGTH	%
IV	485m	4
III	1695m	12
II	5790m	40
I	6330m	44
TOTAL		14300m 100

STREETS TYPE IV: Major arterial, vehicles dominate strongly over pedestrians. Through traffic for all kind of vehicles. Stricter controls are established for the protection of pedestrians, rails, traffic lights, overpasses. Provide access to the locality, determines major transportation routes. Service streets are used for secondary transportation routes. It may be in the future a limited access thruway.

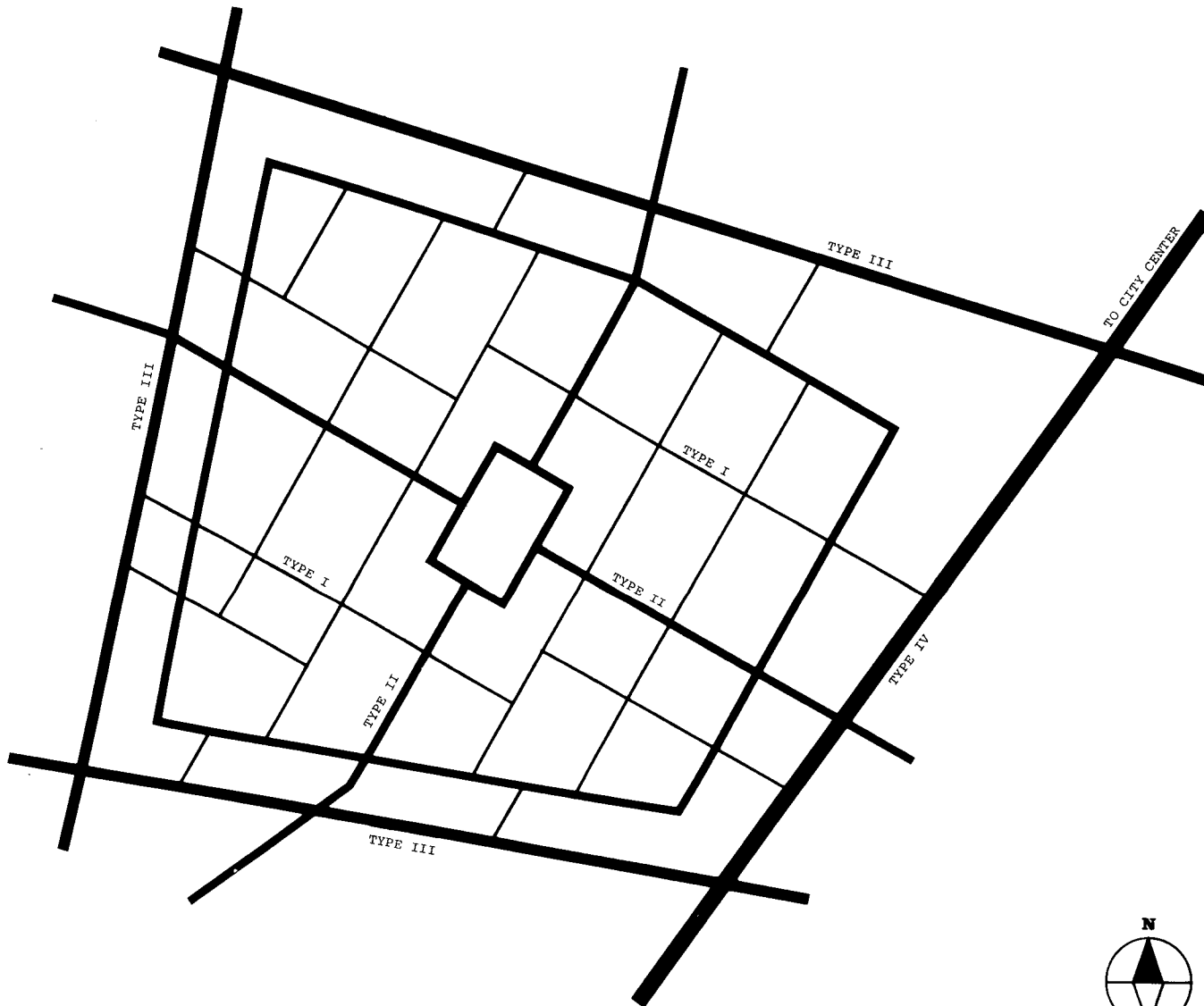
STREETS TYPE III: Vehicle dominate. Local and through traffic for all kind of vehicles and pedestrians. Controls are established for protection of pedestrians: Crosswalks traffic lights, rails, overpasses and underpasses. May delineate the neighborhood.

STREETS TYPE II: Vehicles and pedestrians. Vehicles dominate but do not control circulation. Local traffic and limited through traffic for vehicles and pedestrians. Control of traffic frequency. Give access to commercial areas, and locality center. Locality transportation route.

STREETS TYPE I: Pedestrians dominate over vehicles. Character and speed are controlled by the street layout. Give access to residential property.

PROJECT NETWORK EFFICIENCY

$$\frac{\text{Network length (streets)} \quad 14300\text{m}}{\text{Areas served (total area)} \quad 117\text{Ha}} = 122\text{m/Ha}$$



1:10000

CIRCULATION PLAN

## HOUSING

The dwelling options proposed for the project are intended to minimize initial investment for the government and the user, providing minimum conditions for immediate occupation and encouraging further up-grading/expansion of the lots/dwellings.

There are three basic options: Progressive services lots, standard services lots, and expandable dwelling units. A reduced number of commercial facilities are also provided.

The progressive services lots are located in clusters type A; electricity, communal water tap, and a cess-pool for each lot, are provided.

The standard services lots are located in clusters type B; full individual connections are provided.

The expandable dwelling units, both apartments and houses, are basic shells which can be internally completed and expanded. They are located on prime, higher value, areas.

Commercial facilities which can alternate as dwellings or shops are provided on ground floor of the buildings.

## URBAN SEGMENTS/CLUSTERS/BLOCKS

The urban segments (neighbourhood), are approximately 400m x 400 m; the project contains four, grouped around the locality center. These urban segments have sufficient semi-public areas which include one primary school, diverse social services, and large recreation area that can accommodate a soccer field and additional sport facilities. Every urban segment can house around 8,000 people.

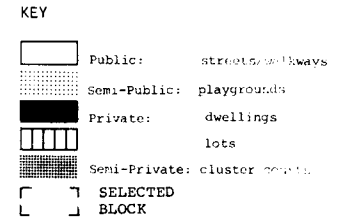
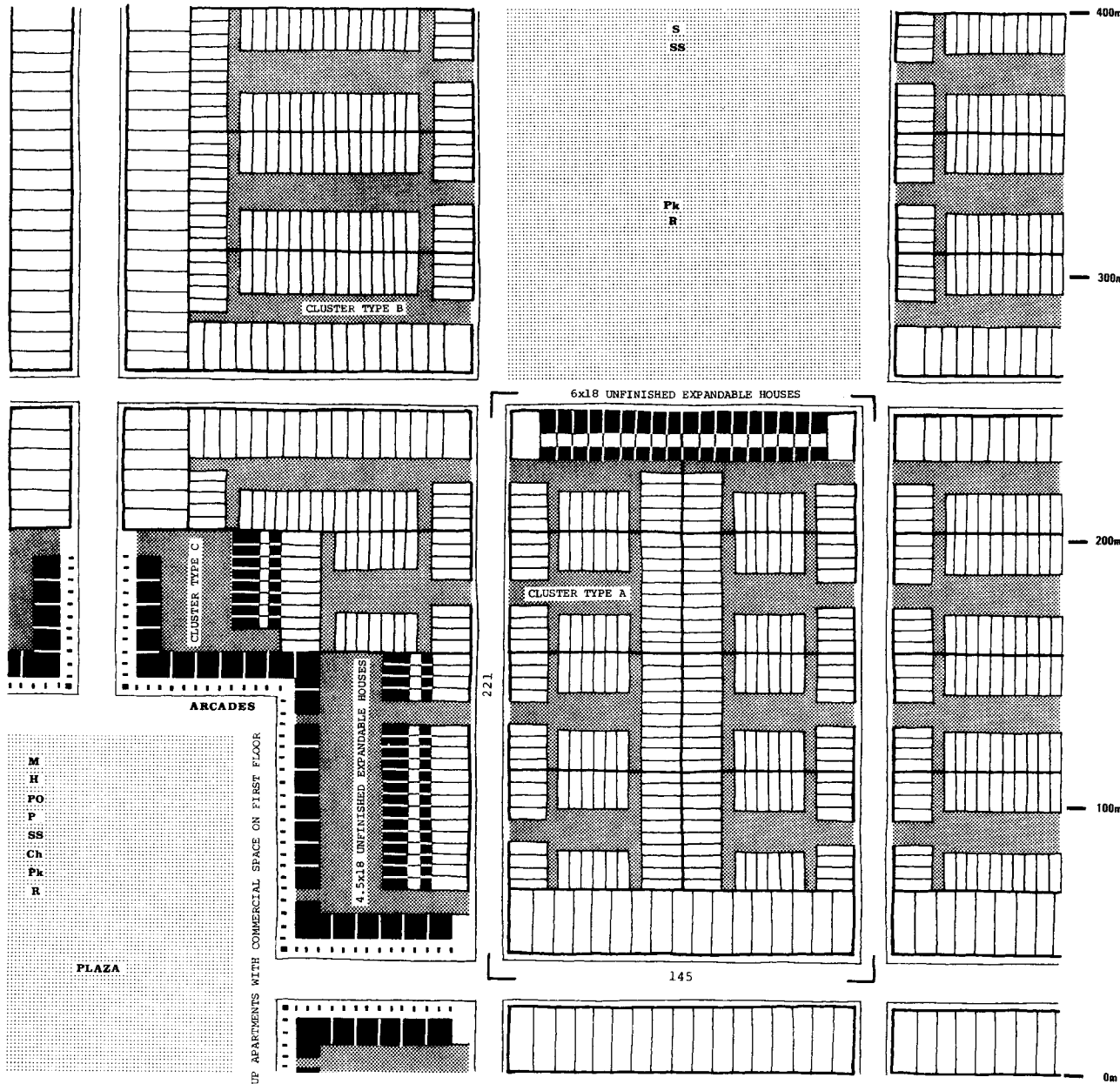
These urban units offer three types of clusters with condominium ownership:

1. Cluster type A: Bordered by one street, contains progressive services lots.
2. Cluster type C: Bordered by two streets contains standard services lots.
3. Cluster type C: Surrounds the locality center, contains expandable houses and apartments.

Commercial shells are provided on the ground floor of the apartment buildings where an arcade will encourage commercial activities.

Privately owned commercial lots are available along the two main local streets.

Block data is shown to the right of the plan.



**LOCALITY BLOCK LAND UTILIZATION DATA**

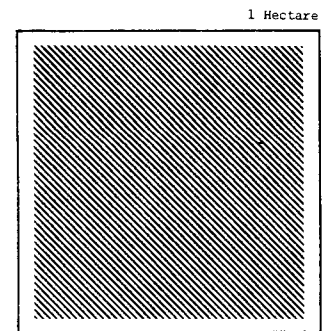
DENSITIES	Total Number	Area Hectares	Density N/Ha
LOTS	247	1.97	125
DWELLING UNITS	247	1.97	125 *
PEOPLE	1482	1.97	752

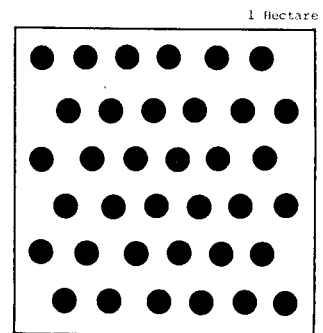
AREAS	Hectares	Percentages
PUBLIC (streets, walkways, open spaces)	.53	17
PRIVATE (dwellings, shops, factories, lots)	1.97	62
SEMI-PRIVATE (cluster courts)	.70	21
<b>TOTAL</b>	<b>3.2</b>	<b>100</b>

\* Lots with double access might be easily turned into two dwelling units.

**LAND UTILIZATION DIAGRAMS**



PERCENTAGES Streets/Walkways 17  
Dwellings/Lots 83



DENSITY 752 Persons/Hectare  
● 20 Persons

**SEGMENT PLAN / BLOCK PLAN**














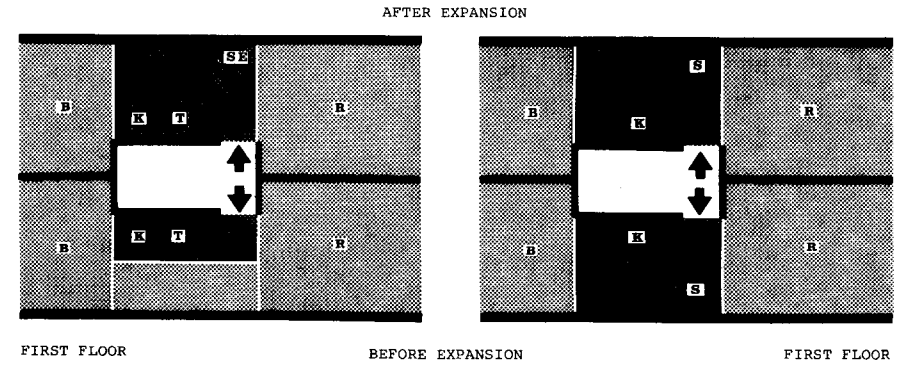
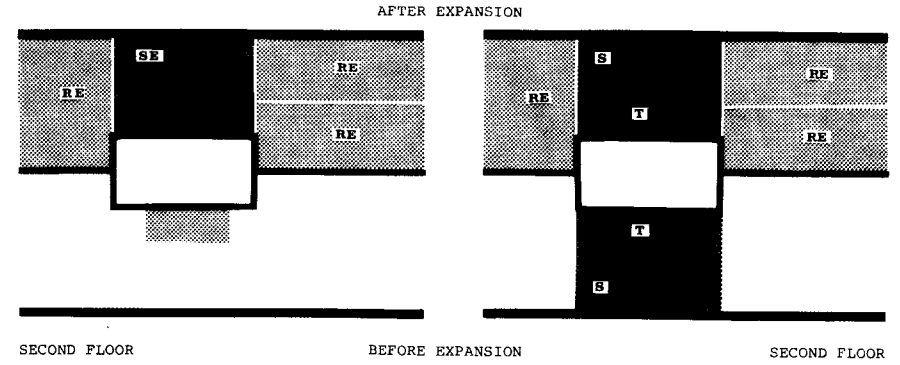
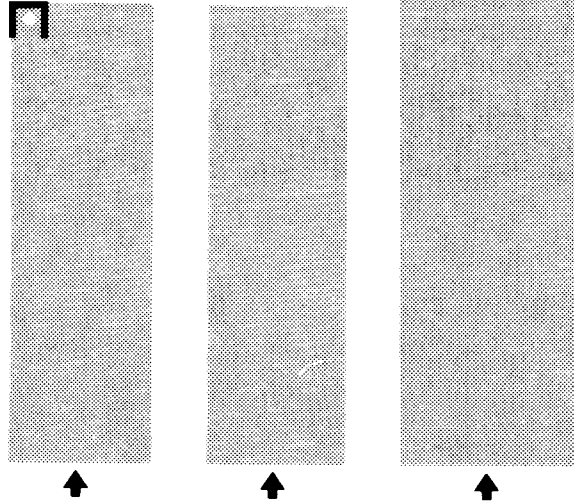
# DWELLING OPTIONS

The following two pages illustrate the different dwelling options available in terms of types, level of services, areas, and costs. It also shows the suggested distribution of the dwelling options among different income groups. Two financial possibilities, 5 year and 10 year, at 6% annual interest, with a 15% down payment are considered. Costs are estimated on actual market values.

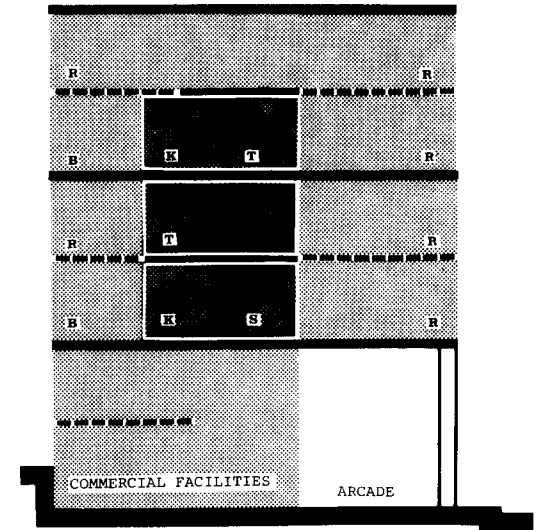
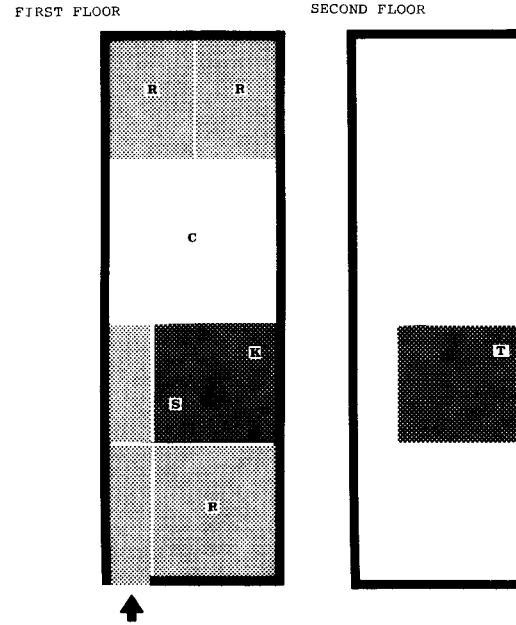
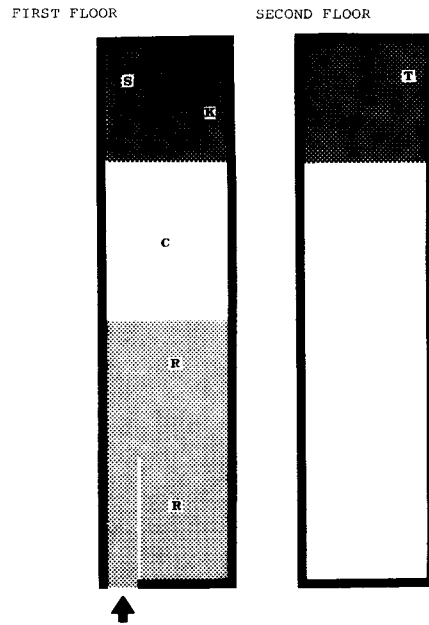
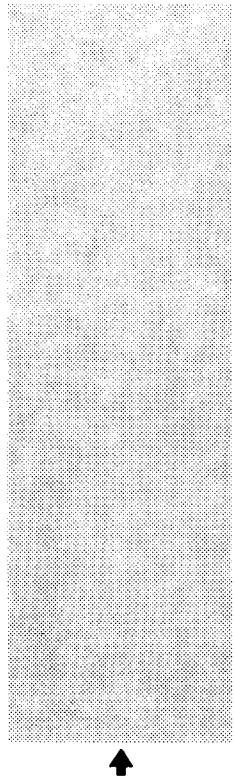
Costs are estimated on actual market values.

**KEY**

-  LOT/BUILT AREA
-  SERVICES/CIRCULATION
-  ACCESS
-  EXPANSION
-  SLAB EXPANSION
-  ROOM
-  KITCHEN AREA
-  TOILET/BATHROOM AREA
-  INTERIOR STAIRS
-  BALCONY
-  COURT



TYPE	4.5x15 Lot + cespool	4.5x15 Lot	6x18 Lot	Expandable Apartment A 4.5x13.5	Expandable Apartment B 4.5x13.5
LEVEL OF SERVICES	Electricity, Communal water	Standard	Standard	Standard	Standard
LOT AREA	67.5m <sup>2</sup>	67.5m <sup>2</sup>	108m <sup>2</sup>	20m <sup>2</sup>	20m <sup>2</sup>
INSTANTLY BUILT AREA	-	-	-	52m <sup>2</sup>	70m <sup>2</sup>
LAND/SERVICES COST	\$ 5.00/m <sup>2</sup>	\$ 13.00/m <sup>2</sup>	\$ 13.00/m <sup>2</sup>	\$ 13.00/m <sup>2</sup>	\$ 13.00/m <sup>2</sup>
CONSTRUCTION COST	-	-	-	\$ 60.00/m <sup>2</sup>	\$ 60.00/m <sup>2</sup>
UNIT TOTAL COST	\$ 337.50	\$ 877.50	\$ 1404.00	\$ 3400.00	\$ 4450.00
15% DOWN PAYMENT	\$ 50.00	\$ 132.00	\$ 210.00	\$ 510.00	\$ 660.00
5 YEAR LOAN	\$ 5.50	\$ 14.50	\$ 23.00	\$ 56.00	\$ 73.00
10 YEAR LOAN	\$ 3.20	\$ 8.50	\$ 13.00	\$ 32.00	\$ 42.00
INCOME LEVEL	Very low	Very low to low income	Low income	Moderate-low income	Lower-middle income
% OF UNITS IN THE PROJECT	39	19	20	7	3
LOCATION	Cluster A	Cluster B	Cluster B, along peripheric street	Cluster C	Cluster C



TYPICAL BUILDING SECTION

7.5x24 Commercial Lot  
 Standard  
 180m<sup>2</sup>  
 -  
 \$ 26.00/m<sup>2</sup>  
 -  
 \$ 4680.00  
 \$ 702.00  
 \$ 77.00  
 \$ 44.00  
 Lower-middle income  
 6  
 Along main access avenues

4.5x18 Expandable House  
 Standard  
 81m<sup>2</sup>  
 76m<sup>2</sup>  
 \$ 13.00/m<sup>2</sup>  
 \$ 55.00/m<sup>2</sup>  
 \$ 5250.00  
 \$ 785.00  
 \$ 86.00  
 \$ 50.00  
 Middle income  
 2.5  
 Cluster C

6x18 Expandable House  
 Standard  
 108m<sup>2</sup>  
 103m<sup>2</sup>  
 \$ 13.00/m<sup>2</sup>  
 \$ 55.00/m<sup>2</sup>  
 \$ 7070.00  
 \$ 1060.00  
 \$ 116.00  
 \$ 67.00  
 Middle-high income  
 1.5  
 In front of semipublic areas



# COMPARISON

The chart on these two pages draws a comparison of segments, blocks, land utilization percentages, circulation lengths, and densities, among the four case studies and the proposed project.

The chart graphically shows the primary physical indicators of every settlement.

It is intended to evaluate/compare existing situations with the proposed project.

## LAND UTILIZATION SUMMARY

LOCALITIES  
DATE  
HOUSE TYPES  
INCOME

LOCALITY SEGMENT 400x400 MTS. 16 HECTARES

LOCALITY: Eight representative localities were selected in order to present a general cross section of urban/dwelling environments with their evolution in Guadalajara.

LOCALITY SEGMENT: For purposes of comparison, a typical segment of 400m by 400m is taken from each locality. The segment shows the subdivision pattern and the circulation layout.

### LOCALITY BLOCK LAND UTILIZATION DATA

LOCALITY BLOCK: Within each locality segment a typical residential block is selected, with the aim of determining land utilization, circulation length and densities in relation to number of lots, dwellings and people.

NUMBER OF LOTS  
AVERAGE LOT AREA  
DWELLING UNITS  
DWELLING UNITS/Ha (gross)

### LAND UTILIZATION DIAGRAMS 1 HECTARE

LAND UTILIZATION PERCENTAGES: Proportions of public land and private areas are compared. Their ratio determines the users control, maintenance responsibility, and functional efficiency of a layout; i.e., a high percentage of public land results in high direct costs of installation and maintenance for the city's administration, as well as high indirect costs due to inefficient use of the land. % OF PRIVATE LAND  
% OF PUBLIC LAND

### NETWORK EFFICIENCY 400x400 MTS. 16 HECTARES

CIRCULATION LENGTHS: A relation between public circulation length and area served indicates the network efficiency; a high ratio means a less efficient network in terms of direct costs and maintenance costs.

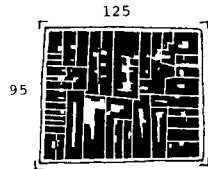
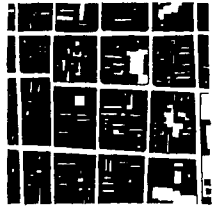
Mts/Ha

### NET DENSITY 1 HECTARE

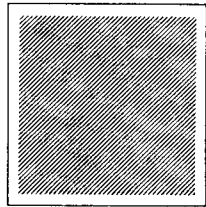
● 20 PERSONS  
DENSITIES: The number of persons per hectare relates to both the number of lots and the type of dwellings per hectare. This determines the intensity of land use; low densities mean higher development costs per person.

PERSONS/Ha

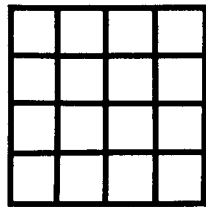
**1 SAN JUAN DE DIOS**  
1920  
Tenements, Old traditional  
Very low, low



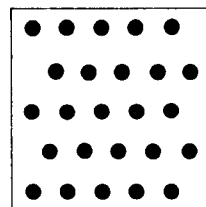
38  
260  
82  
84



82  
18

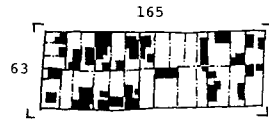
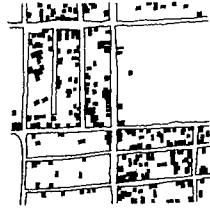


200

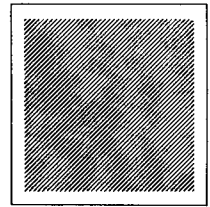


500

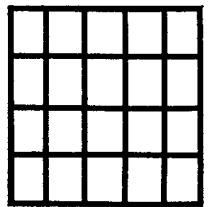
**2 COL. ECHEVERRIA**  
1970  
New illegal subdivision  
low



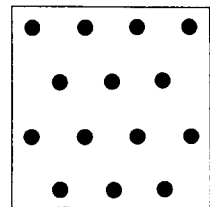
30  
266  
38  
37



77  
23

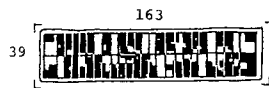


229

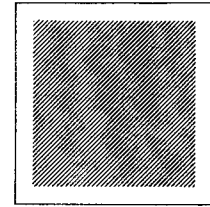


285

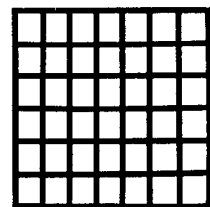
**3 SANTA CECILIA**  
1960-70  
Private speculative  
Mod. low, low



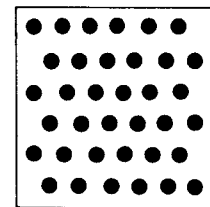
52  
85  
52  
80



67  
33

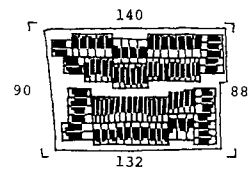


325

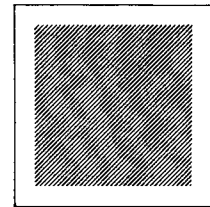


710

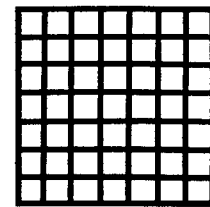
**4 LA TUZANIA**  
1970  
Public housing  
Mod. low, middle



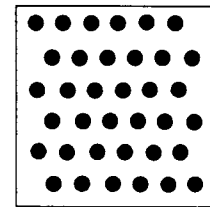
93  
85  
93  
75



63  
37

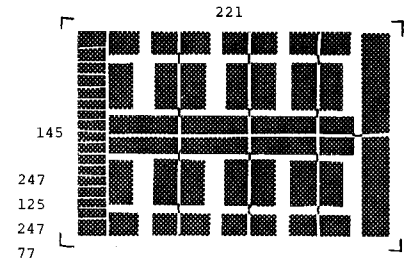
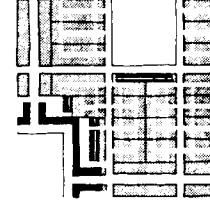


331

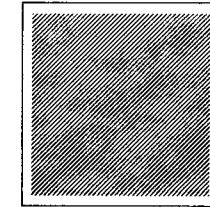


710

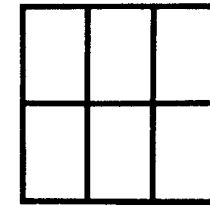
**PROPOSED PROJECT**  
1978  
Proposed  
From very low to middle income



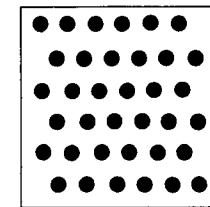
247  
125  
247  
77



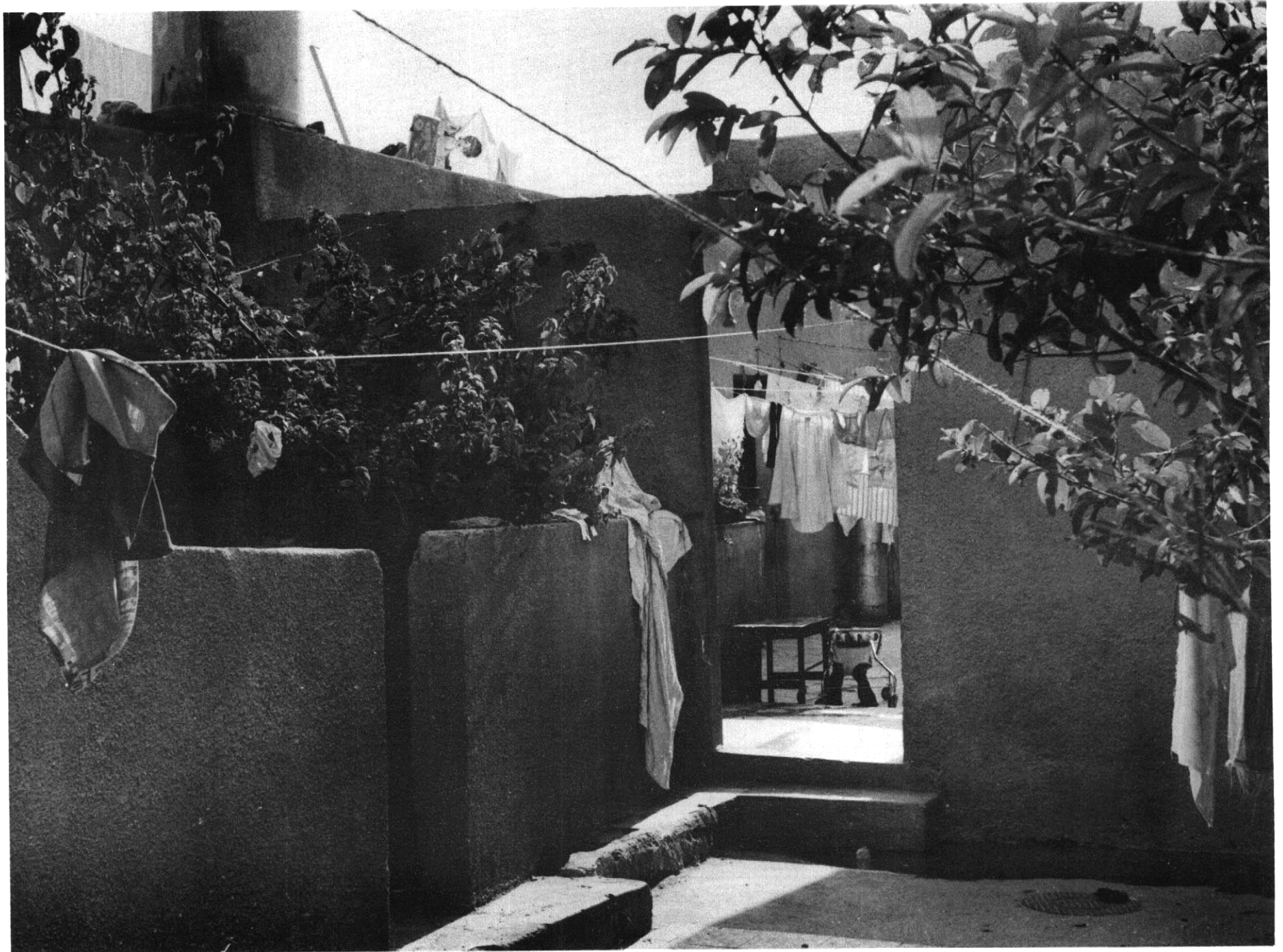
62  
17



125



752



## APPENDIX

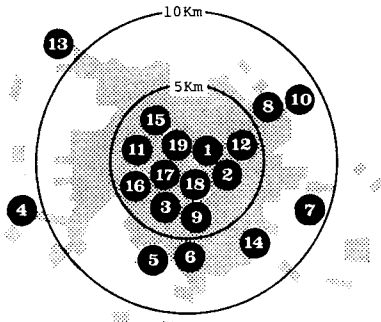
Additional information is presented in this section of the work:

Appendix I illustrates the typical dwelling units found in the city according to the housing systems classification outlined on the introduction. It complements the physical data matrix of page 11.

Appendix II provides background information about Mexico it covers the following: People, geography, history, economy and government.

PHOTOGRAPH, OPPOSITE PAGE:  
A TENEMENT COURT. (Col. La Esperanza)

# APPENDIX I DWELLING TYPES Guadalajara, Mexico



### DWELLING TYPES

The dwelling types cover the range of income levels from very low to middle-high income. They represent past and present trends of evolution in the housing market.

This chart provides a reference guide to compare dwelling types in relation with incomes, lot areas, dwelling areas, construction time, and existing percentage of dwelling units in the city.

The dwelling types are arranged vertically according to their income levels.

### KEY

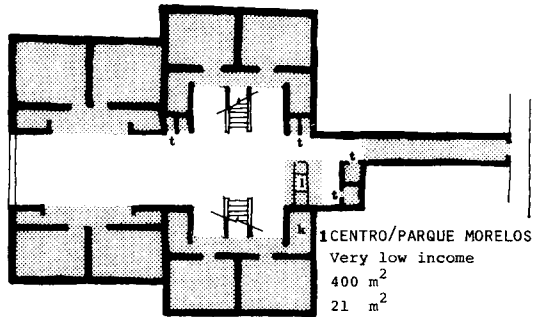
- k KITCHEN
- t TOILET/BATHROOM
- p PIT LATRINE
- w WELL
- l LAUNDRY AREA



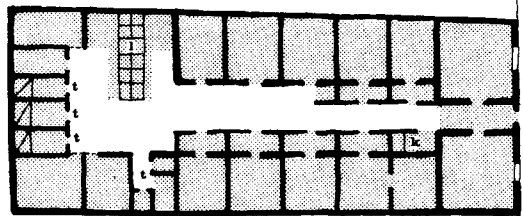
1:500

### TENEMENTS VECINDADES

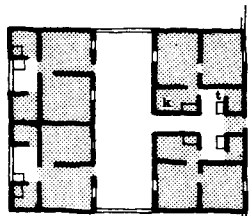
TENEMENTS: The origins of this type can be traced back to the 16th century. There are three types: In the city center, (these are rapidly disappearing due to increasing commercial pressure). In the inner ring, old houses transformed into tenements which are being renovated and maintained through different municipal policies. And the new "apartment type" tenement, (minimum dwelling unit allowed by the current municipal codes), tends to proliferate in the periphery.



**1 CENTRO/PARQUE MORELOS**  
Very low income  
400 m<sup>2</sup>  
21 m<sup>2</sup>  
1900  
3%



**2 SAN JUAN DE DIOS**  
Very low income  
480 m<sup>2</sup>  
20 m<sup>2</sup>  
1910  
10%



**3 COLONIA DEL FRESNO (A)**  
Very low income  
192 m<sup>2</sup>  
33 m<sup>2</sup>  
1960  
4%

### ILLEGAL SUBDIVISION

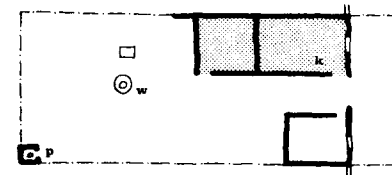
ILLEGAL SUBDIVISION: Since 1970 the growth trend of the city, and the availability of government land (ejidos) around the city, have brought this type to account for an increasing share of the city's housing stock. It is generally found in new illegal subdivisions on former agricultural parcels. Few old settlements with similar types in terms of physical dwelling characteristics can be found around the city, especially in the farms that did not follow the urban layout regulations nor the old construction codes, and today are well consolidated localities.



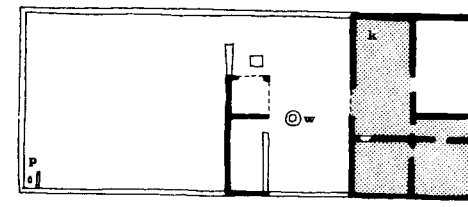
**4 LA PIRAMIDE**  
Very low/low income  
70 m<sup>2</sup>  
28 m<sup>2</sup>  
1975  
4%



**5 DOMINGO SAVIO**  
Low income  
176 m<sup>2</sup>  
21 m<sup>2</sup>  
1975  
2%



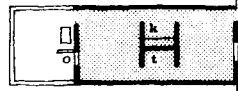
**6 COLONIA ECHEVERRIA**  
Low income  
250 m<sup>2</sup>  
24 m<sup>2</sup>  
1970  
6%



**7 TETLAN**  
Low income  
360 m<sup>2</sup>  
70 m<sup>2</sup>  
1900  
4%

**PRIVATE SPECULATIVE****COLONIAS POPULARES**

PRIVATE SPECULATIVE: The development of private speculative projects started in the 1940s. The dimensions and areas of the lots have been systematically reduced since then. There are two generations of types which can be distinguished: The old ones where the regular subdivision of the old traditional blocks resulted in deep lots, and the new ones with a depth based on the minimum area required by law, and that in most cases was further subdivided. Rising costs of urbanization have made this developments too expensive for the low-income.



**8 LA ESPELANZA**  
Low/moderate-low income  
75 m<sup>2</sup>  
53 m<sup>2</sup>  
1965  
5%



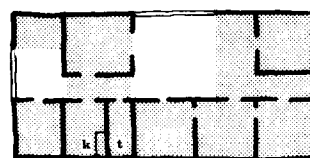
**9 COLONIA DEL FRESNO (B)**  
Moderate-low income  
45 m<sup>2</sup>  
40 m<sup>2</sup>  
1960  
2%



**10 SANTA CECILIA**  
Moderate low income  
75 m<sup>2</sup>  
52 m<sup>2</sup>  
1960  
12%



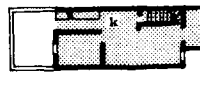
**11 SANTA TERESITA (A)**  
Moderate low/middle income  
120 m<sup>2</sup>  
100 m<sup>2</sup>  
1955  
10%



**12 SAN JUAN BOSCO**  
Middle income  
200 m<sup>2</sup>  
150 m<sup>2</sup>  
1950  
6%

**PUBLIC HOUSING**

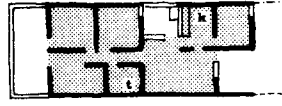
PUBLIC HOUSING: These kind of projects were introduced in the mid 1960s. They are typical examples of government policies in housing design. They are the only ones in this chart, designed by professionals: Architects/engineers, with the result that the designs are in clear contrast to all of the other dwelling types. The dwellings are generally subsidized, poorly designed, and badly constructed. User's needs are seldom met. The types represent images of "bourgeois" aspirations that deformats reality penalizing the people in terms of maintenance, use, and location.



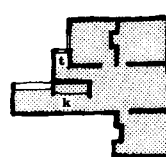
**13 LA TUZANIA**  
Middle-high income  
64 m<sup>2</sup>  
75 m<sup>2</sup>  
1970  
1%



Second floor



**14 EL ALAMO**  
Middle/high income  
108 m<sup>2</sup>  
75 m<sup>2</sup>  
1960  
4%



**15 LADRON DE GUEVARA (WALK-UP)**  
Middle/middle-high income  
2,300 m<sup>2</sup>  
60 m<sup>2</sup>  
1965  
1%

**OLD TRADITIONAL**

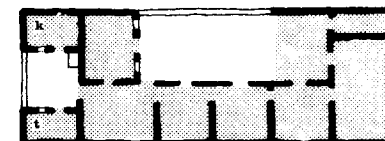
OLD TRADITIONAL: The origins of this type can be traced back to the 16th century, when the model was imported from Southern Spain. It evolved up until the 1940s conserving the essential parts of the house: Entrance (zaguan), corridor and court. The last types were developed on very deep lots with reduced widths, but the general simple principle was maintained. This type tends to disappear especially in those areas of rapid commercial growth.



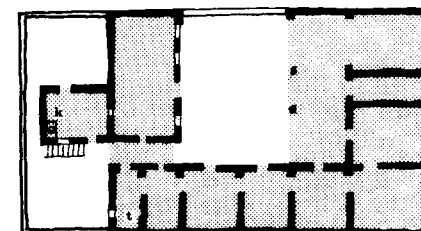
**16 SANTA TERESITA (B)**  
Middle-high income  
165 m<sup>2</sup>  
100 m<sup>2</sup>  
1940  
7%



**17 CAPILLA DE JESUS**  
Middle-high income  
195 m<sup>2</sup>  
165 m<sup>2</sup>  
1930  
5%



**18 SANTUARIO**  
Middle-high/high income  
225 m<sup>2</sup>  
165 m<sup>2</sup>  
1920  
3%



**19 SAN FELIPE**  
Middle-high/high income  
375 m<sup>2</sup>  
245 m<sup>2</sup>  
1900  
2%

## APPENDIX II

### NATIONAL CONTEXT

#### Mexico

##### PEOPLE

Population: 65 000,000 \*

Urb. Population %: 60 \*

Rur. Population %: 40 \*

Population Growth: 3.5% per annum

Population Density: 32 inhabitants/ sq. km.

Ethnic Groups: Indian Spanish Mestizo 60%

American Indians 30%

Caucasian/minorities 10%

Religion: Roman Catholic 97%

Language: Spanish 98%

Literacy: 65%

Life Expectancy: 61 yrs.

\* 1977 estimated

##### GEOGRAPHY

Area: 1 980,000 sq. kms.

Major Cities: Mexico city (capital) 10 mll.

Guadalajara 2 mll.

Monterrey 1.8 mll.

Cd. Juarez .5 mll.

##### ECONOMY

Gross National Product (GNP): US \$ 50 billion

GNP per capita: US \$ 910.

GNP per capita growth rate: 2.8%

Currency: Mexican Peso (22.60 = US \$ 1.)

##### AGRICULTURE

Land: Cropland 12%, pasture 40%; labor 40%

Products: Corn, cotton, wheat, coffee, sugar-cane.

##### INDUSTRY

Labor: 34%

Products: Food processing, chemicals, basic metals, metal products, petroleum products.

##### NATURAL RESOURCES

Petroleum, silver, copper, gold, lead, zinc, natural gas, timber.

##### TRADE

Exports: 2.631 billion 1973. Cotton, coffee, nonferrous metal, sugar, shrimp, corn, petroleum, sulfur, salt, cattle and meat, fresh fruits, tomatoes.

Imports: 4.146 billion 1973. Machinery, equipment, industrial vehicles, intermediate goods.

Partners: US. 60%, European communities (EC), Japan.

##### GOVERNMENT

Type: Federal Republic

Republic established: 1822

Constitution: 1917

Branches: Executive-President, Chief of state head of government.

Legislative-Bicameral

Judicial-Supreme court, local and federal system.

##### Political parties:

Institutional Revolutionary Party (PRI)

National Action Party (PAN)

Popular Socialist Party (PPS)

Authentic Party of the Revolution (PARM)

Mexican Communist Party (PCM)

Mexican Workers Party (PMT)

Suffrage: Universal over 18

Political subdivisions: 31 States and the Federal Districte.

##### HISTORY

Olmecan and Teotihuacan cultures presumably reached their peak several centuries before Christ.

325 to 925 (A.D.): Classic mayan period surpassed all other pre-Colombian civilizations.

600 (A.D.): Toltecs entered the valley of Mexico developing an original culture.

1100: Chichimecas conquered this valley and adopted Tolteca's civilization.

1200: Aztecs subjugated the region and extended their rule until the arrival of the Spaniards.

1521: Hernan Cortez conquered Tenochtitlan.

1521 to 1810: Spaniards extended the limits of the colony.

1810 to 1822: War of Independence.

1835: Texas proclaimed independence.

1845: Mexico-US war; the latter annexed more than half the territory of the country.

1858: Benito Juarez's reforms confiscated all church properties lessening its power.

1865: Mexico-French war finalized with the victory over the imposed Hapsburg emperor.

1876 to 1910: Porfirio Diaz's dictatorship.

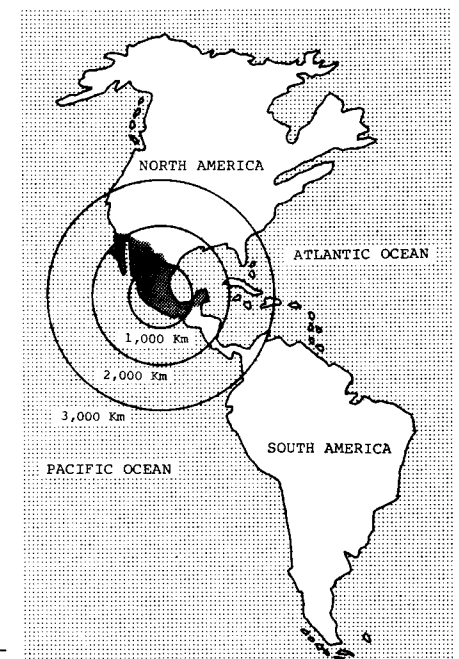
1910: Mexican Revolution; all economic and social problems of the last period erupted in this popular movement that culminated with the Constitution of 1917.

From 1917: the Revolutionary Party, under various names and after a number of reorganizations, continues to be the most important political force in the nation.

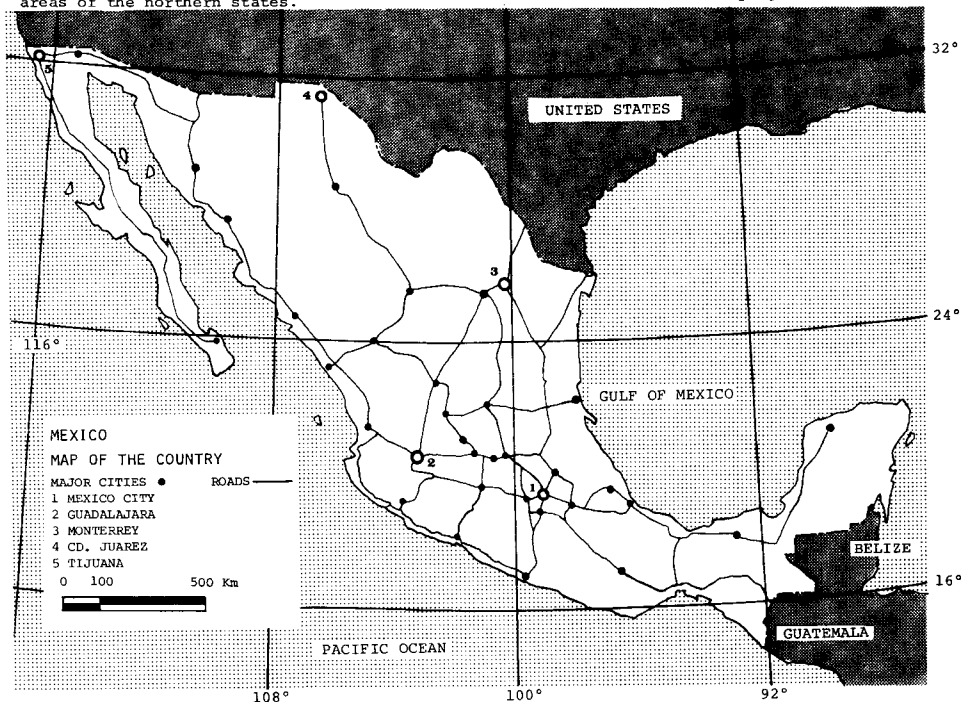
1. PEOPLE. Mexico is the most populous Spanish-speaking country in the world. With a high birthrate and with progressively increasing longevity resulting from improved living conditions, each decade of the twentieth century has seen a rise in the population growth rate; in 1970s it was among the highest in the world. This rate of growth has placed increasing pressure on the limited amount of arable land. At the same time, an expanding educational system, improved communications, and the growth of industry have tended to draw young people away from the farms and into the cities and towns.

The proportion of agriculture workers has declined sharply since 1960. Industry registered a substantial gain, but it was in the service sector that the largest gain was recorded as migrants from the countryside took marginal jobs in small shops, as street vendors, or as domestic servants.

More than half of the people live in central Mexico, but large internal population shifts have occurred since 1950. Initially the shift from the underdeveloped southeastern states and the central plateau was to the urban centers, -Mexico City, Monterrey and Guadalajara, - but recently migration shifted to the border areas of the northern states.



LOCATION MAP: Circles represent approximately one hour flying time



2. GEOGRAPHY. Mexico is third in size among the countries of Latin America (after Brazil and Argentina). Extending south from its border with United States, Mexico is in the shape of a narrowing cone, broken in the north by the long narrow peninsula of Baja California and in the extreme southeast by the blunt peninsula of Yucatan.

Two mountain ranges extend roughly parallel to the coastal lowlands, and between them lies a very large interior plateau. The plateau narrows to the south and terminates in a transverse mountain range consisting of a series of volcanoes, some of which are still active. This highland region of volcanic cones is the heart land of Mexico, most of the large cities and the densest rural population are located in its basins and valleys. Climate is generally more related to altitude than to latitude. Most of the country is dry; only 12% of the total area receives rainfall in all seasons. However arable land is subject to irregular rainfall, floods and droughts.

3. HISTORY. Before the Spaniards arrived, much of what is present-day southern Mexico as well as part of contemporary Guatemala and Belize, were occupied by different cultures in distinct periods of time, some of them only left testimonies of their greatest civilizations, such as the Olmecs and the Teotihuacans. During six centuries (A.D. 325 to 925) the classic Mayan period surpassed all other pre-Colombian civilizations.

About the tenth century the Chichimecas conquered the valley of Mexico and adopted the Toltec culture.

Probably in the twelfth century the Aztecs came and extended their rule until the arrival of the Spaniards.

When Hernan Cortez, aided by Indians enemies of the Aztecs, conquered Tenochtitlan, he encountered an advanced civilization. In their zeal to introduce Roman-Catholicism, the Spaniards destroyed many symbols of the Indian civilization, notably magnificent temples and well planned cities.

The Spaniards extended the limits of the country far beyond the pre-Colombian settlements and ruled for 300 years. The colony was based on the exploitation of Indian labor and the extraction of natural resources, mainly precious metals.

By the end of the colonial period, the wealth of the colony made it by far the prize posses-

sion of the Spanish crown but the "criollo" elite (Mexican born Spanish) resented the fact that they were socially, politically, and economically subordinated to Spain.

Despite late reforms of the monarchy and with the adoption of democratic ideas the colony rebelled in 1810 and declared Independence in 1822.

From this date up until 1876 the new country was in a continuous state of war and under several types of regimes, the more important events were:

In 1835 independence of Texas; in 1845 the Mexican-American war where the US annexed more than half the territory of the country; in 1858 the reforms of Juarez which confiscated all church properties, appreciatedly lowered the power and hierarchy of the church in national affairs; in 1864 Napoleon imposed a Hapsburg emperor, who finally was defeated in 1867; from 1876 to 1910 Porfirio Diaz's dictatorship was turned over with the subsequent revolution in 1910. All the social and economic problems of this period of development erupted in this popular movement, that ended with the Mexican Constitution of 1917.

Since that time the Revolutionary Party, under various names and after a number of reorganizations continues to be the most important political force in the nation.

4. ECONOMY. Mexico, at the end of 1974 was completing twenty-five years of rapid economic growth, but the government was confronted with problems of inflation and uneven distribution of wealth.

Agriculture has contributed an ever-decreasing share to the GNP and has represented only 10% since 1950. After more than fifty years of agrarian reform there were more than 2.8 million farming units that employed 40% of the labor force, but half of all the agricultural production came from 4% of the farms. The vast majority were either subsistence farms or produced only for nearby markets with ancient methods.

Mexico is self-sufficient in many products, although in some years imports of crops are required when the harvest is poor. Mexico ranks among the major beef producing and exporting nations.

Industrial production includes most consumer goods, and many intermediate and capital goods. Industry employs 18% of the labor force and represents 28% of the GNP in 1973. 80% of all

manufactured products sold in the country are locally produced. Most of the industry has resulted from high protective import barriers. 57% of all manufacturing enterprises are concentrated in clothes and food-processing.

The government follows a policy of maintaining a mixed economy and plays an active role.

The government is an investor, a provider of substantial credit, and an entrepreneur. It has a dominant role in certain sectors: Petroleum, railroads, electricity, communications, irrigation, steel manufacturing, aviation, and petrochemicals. It plays an extensive role in finance and operates the largest marketing and retailing organization. Indirectly it acts to influence the level and direction of private investment by such means as concessions for the exploitation of minerals, exclusion of imports competing with domestic products and the granting of fiscal and tax incentives and benefits.

Since 1940, imports have far exceeded exports, resulting in an unfavorable balance of trade but not in amounts sufficient to cause overall balance-of-payments difficulties.

Although the gap between imports and exports is a continual threat, the trade deficit is almost covered by receipts from tourism and incoming capital. By 1973 United States had provided nearly 80% of total foreign investment, the Federal Republic of Germany, the United Kingdom, France, and Japan, in that order accounted for the rest.

Although Mexico is a relatively wealthy country, it has not been able to eliminate poverty or to improve income distribution, especially between the rural and urban inhabitants. In addition inflation has become sufficiently high to cause concern and to stimulate discontent in the labor force. Inflationary pressure first became evident in 1970. By 1973 the national retail price index had risen by more than 20% over 1972, in part the result of heavy borrowing by the government and the western recession. This precipitated an economic crisis that led to the devaluation of the peso in 1976.

The unemployment rate is estimated as 16% of the working population. This figure and the consequences in the economy would be far greater and severe were it not for the massive scape valve provided by the illegal movement of "wet-backs" into the United States

5. GOVERNMENT. During the first half century of independence, Mexico experimented with or was subject to, at least forty forms of government, including federal and centralized organization, constitutional monarchy, dictatorship, and representative democratic government.

The Constitution sets forth a tripartite division of power among executive, legislative, and judicial branches. The powers of the executive invested in a president far exceed those of the other branches, and the federal government assumes extensive rights to intervene in the states.

The formula for continuity and relative stability in government that has evolved since the revolution is replete with seeming contradictions: A very strong president who is barred from reelection; a weak national Congress in which token representation of the opposition is guaranteed; elected state governors with considerable local autonomy but only as long as they remain unquestionably loyal to the president; monopolization of political activities by a single party but one that is broadly based; and universal suffrage but little choice for the voters. With the vast apparatus of the state behind it, the Institutional Revolutionary Party, (Partido Revolucionario Institucional, PRI) has been invincible at the polls since its inception in 1929 as the government party. Thus, it has generally been able to determine how much and what kind of opposition it will encourage or tolerate.

The Mexican political system, since the consolidation of the revolution in 1920s and 1930s, has been considered one of the most unusual of the world. For several decades it was generally viewed as a stable democracy dominated by a single party. By the 1970s however, in light of the stern repression of students demonstrations in 1968, many observers had concluded that the persistence of the revolutionary ethos has served to camouflage a generally benign, in many respects enlightened, but increasingly "bourgeois" and decidedly authoritarian system.

# GLOSSARY

The criteria for the preparation of the definitions have been as follows:

-FIRST PREFERENCE: definitions from "Webster's Third New International Dictionary", Merriam-Webster, 1971.

-SECOND PREFERENCE: definitions from technical dictionaries, text books, or reference manuals.

-THIRD PREFERENCE: definitions from the Urban Settlement Design Program (U.S.D.P.) files. They are used when existing sources were not quite appropriate/satisfactory.

Words included for specificity and to focus on a particular context are indicated in parenthesis.

Sources of definitions are indicated in parenthesis. (See also: REFERENCES).

**ACCESSES.** The pedestrian/vehicular linkages from/to the site to/from existing or planned approaches (urban streets, limited access highways, public transportation systems, and other systems such as: waterways, airlines, etc.) (U.S.D.P.)

**ACTUAL LAND COST.** "(The cost of land is)...set solely by the level of demand. The price of land is not a function of any cost conditions; it is set by the users themselves in competition." (Turner, 1971)

**AD VALOREM (TAX).** A tax based on a property's value; the value taxed by local governments is not always or even usually the market value, but only a valuation for tax purposes. (U.S.D.P.)

**AIRPORT DISTURBANCE.** The act or process of destroying the rest, tranquility, or settled state of (the site by the annoyance of airport noise, vibration, hazards, etc.) (Merriam-Webster, 1971)

**AIRPORT ZONING RESTRICTIONS.** The regulation of the height or type of structures in the path of moving aircraft. (Abrams, 1971)

**ALTERNATING CURRENT (A.C.)** (an electric) current that reverses its direction of flow at regular intervals. (ROTC ST 45-7, 1953)

**AMENITY.** Something that conduces to physical or material comfort or convenience, or which contributes satisfaction rather than money income to its owner. (Merriam-Webster, 1971)

**AMPERES.** Amperes (amp) are a measure of the rate of flow of electricity. It is somewhat comparable to the rate of flow of water (quantity/time). A steady current produced by one volt applied across a resistance of one ohm. (ROTC ST 45-7, 1953)

**APPRAISAL.** An estimate and opinion of value, especially by one fitted to judge. (Merriam-Webster, 1971)

**APPROACHES.** The main routes external to the site (pedestrian/vehicular) by which the site can be reached from other parts of the urban context. (U.S.D.P.)

**ASSESSED VALUE.** A valuation placed upon property by a public officer or board as a basis for taxation. (Keyes, 1971)

**ASSESSMENT.** The valuation of property for the purpose of levying a tax or the amount of the tax levied. (Keyes, 1971)

**BACKFILL.** Earth or other material used to replace material removed during construction, such as in culvert, sewer, and pipeline trenches and behind bridge abutments and retaining walls or between an old structure and a new lining. (DePina, 1972)

**BARRIER.** (A boundary) as a topographic feature or a physical or psychological quality that tends to separate or restrict the free movement (to and from the site). (Merriam-Webster, 1971)

**BETTERMENT (TAX).** A tax on the increment in value accruing to an owner because of development and improvement work carried out by local authorities. (U.S.D.P.)

**BINDER COURSE.** A transitional layer of bituminous paving between the crushed stone base and the surface course (to increase bond between base and surface course). (DePina, 1972)

**BITUMINOUS.** A coating of or containing bitumin; as asphalt or tar. (DePina, 1972)

**BLOCK.** A block is a portion of land bounded and served by lines of public streets. (U.S.D.P.)

**BOUNDARY.** Something (a line or area) that fixes or indicates a limit or extent (of the site). (Merriam-Webster, 1971)

**BUILDING CODE.** "A body of legislative regulations or by-laws that provide minimum standards to safeguard life or limb, health, property, and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, location and maintenance of all buildings and structures within the city, and certain equipment specifically regulated therein." (BOCA, 1967)

**BUILDING DRAIN.** Lowest horizontal piping of the building drainage system receiving discharge from soil, waste, and other drainage pipes. It is connected to the building sewer. (ROTC ST 45-7, 1953)

**BUILDING MAIN.** Water-supply pipe and fittings from the water main or other source of supply to the first branch of the water-distribution system of a building. (ROTC ST 45-7, 1953)

**CESS POOL.** An underground catch basin that is used where there is no sewer and into which household sewage or other liquid waste is drained to permit leaching of the liquid into the surrounding soil. (Merriam-Webster, 1971)

**CIRCULATION.** System(s) of movement/passage of people, goods from place to place; streets, walkways, parking areas. (U.S.D.P.)

**CLAY.** A lusterless colloidal substance, plastic when moist (crystalline grains less than 0.002mm in diameter). (U.S.D.P.)

**CLEANOUT.** A plug or similar fitting to permit access to traps or sewer lines. Cleanouts are usually used at turns and other points of collection. (ROTC ST 45-7, 1953)

**CLIMATE.** The average condition of the weather at a particular place over a period of years as exhibited by temperature, wind, precipitation, sun energy, humidity, etc. (Merriam-Webster, 1971)

**COLLECTION SYSTEM.** The system of pipes in a sewage network, comprised of house service, collection lines, manholes, laterals, mains. (U.S.D.P.)

**COMBINED SEWER.** A sewer that carries both storm water and sanitary or industrial wastes. (DePina, 1972)

**COMMUNITY.** The people living in a particular place or region and usually linked by common interests: the

region itself; any population cluster. (U.S.D.P.)

**COMMUNITY FACILITIES/SERVICES.** Facilities/services used in common by a number of people. It may include: schools, health, recreation, police, fire, public transportation, community center, etc. (U.S.D.P.)

**COMMUNITY RECREATION FACILITIES.** Facilities for activities voluntarily undertaken for pleasure, fun, relaxation, exercise, self-expression, or release from boredom, worry, or tension. (U.S.D.P.)

**COMPONENT.** A constituent part of the utility network. (U.S.D.P.)

**CONDOMINIUM.** Condominium is a system of direct ownership of a single unit in a multi-unit whole. The individual owns the unit in much the same manner as if it were a single family dwelling: he holds direct legal title to the unit and a proportionate interest in the common land and areas. Two types of condominiums are recognized: *HORIZONTAL*: detached, semi-detached, row/grouped dwelling types; *VERTICAL*: walk-up, high-use dwelling types. (U.S.D.P.)

**CONDUCTORS.** Materials which allow current to flow such as aluminum, copper, iron. (ROTC ST 45-7, 1953)

**CONDUIT.** A pipe or other opening, buried or above ground, for conveying hydraulic traffic, pipelines, cables, or other utilities. (DePina, 1972)

**CONSERVATION EASEMENT.** An easement acquired by the public and designed to open privately owned lands for recreational purposes or to restrict the use of private land in order to preserve open space and protect certain natural resources. (U.S.D.P.)

**CONURBATION.** Area of large urban communities where towns, etc. have spread and became joined beyond their administrative boundaries. (A.S. Hornby, A.P. Cowie, J. Windsor Lewis, 1975)

**CONURBATION.** An aggregation or continuous network of urban communities. (Merriam-Webster, 1963)

**CORPORATION COCK/CORPORATION STOP.** A water or gas cock by means of which utility-company employees connect or disconnect service lines to a consumer. (Merriam-Webster, 1971)

**COSTS OF URBANIZATION.** Include the following: *CAPITAL*: cost of land and infrastructure; *OPERATING*: cost of administration, maintenance, etc.; *DIRECT*: include capital and operating costs; *INDIRECT*: include environmental and personal effects. (U.S.D.P.)

**CURRENT** (See: ALTERNATING CURRENT, DIRECT CURRENT). An electric current is a movement of positive or negative electric particles (as electrons) accompanied by such observable effects as the production of heat, of a magnetic field, or of chemical transformation. (Merriam-Webster, 1971)

**CYCLE.** One complete performance of a vibration, electric oscillation, current alternation, or other periodic process. (Merriam-Webster, 1971)

**DAM.** A barrier preventing the flow of water; a barrier built across a water course to confine and keep back flowing water. (Merriam-Webster, 1971)

**DEPRECIATION ACCELERATION (TAX).** A tax incentive designed to encourage new construction by allowing a faster write-off during the early life of a building. (U.S.D.P.)

**DESIGN.** 1) The arrangement of elements that make up a work of art, a machine or other man-made object. 2) The process of selecting the means and contriving the elements, steps, and procedures for producing what will adequately satisfy some need. (Merriam-Webster, 1971)

**DETACHED DWELLING.** Individual dwelling unit, separated from others. (U.S.D.P.)

**DEVELOPMENT.** Gradual advance or growth through progressive changes; a developed tract of land (U.S.D.P.)

**DEVELOPMENT SIZE.** There are two general ranges of size: *LARGE*: may be independent communities requiring their own utilities, services, and community facilities; *SMALL*: generally are part of an adjacent urbanization and can use its supporting utilities, services, and community facilities. (U.S.D.P.)

**DIRECT CURRENT (D.C.)** (An electric current that) flows continuously in one direction. (ROTC ST 45-7, 1953)

**DISCHARGE (Q).** Flow from a culvert, sewer, channel, etc. (DePina, 1972)

**DISTANCE.** The degree or amount of separation between two points (the site and each other element of the urban context) measured along the shortest path adjoining them (paths of travel). (Merriam-Webster, 1971)

**DISTRIBUTION (STATION).** The part of an electric supply system between bulk power sources (as generating stations or transformation station tapped from transmission lines) and the consumers' service switches. (Merriam-Webster, 1971)

**DISTURBED SOIL.** Soils that have been disturbed by artificial process, such as excavation, transportation, and compaction in fill. (U.S.D.P.)

**DRAINAGE.** Interception and removal of ground water or surface water, by artificial or natural means. (De Pina, 1972)

**DUST/DIRT.** Fine dry pulverized particles of earth, grit, refuse, waste, litter, etc. (Merriam-Webster, 1971)

**DWELLING.** The general, global designation of a building/shelter in which people live. A dwelling contains one or more dwellings. (U.S.D.P.)

**DWELLING BUILDER.** Four groups are considered: *SELF-HELP BUILT*: where the dwelling unit is directly built by the user or occupant; *ARTISAN BUILT*: where the dwelling unit is totally or partially built by a skilled craftsman hired by the user or occupant; payments can be monetary or an exchange of services; *SMALL CONTRACTOR BUILT*: where the dwelling unit is totally built by a small organization hired by the user, occupant, or developer; 'small' contractor is defined by the scale of operations, financially and materially; the scale being limited to the construction of single dwelling units or single complexes; *LARGE CONTRACTOR BUILT*: where the dwelling unit is totally built by a large organization hired by a developer; 'large' contractor is defined by the scale of operations, financially and materially; the scale reflects a more comprehensive and larger size of operations encompassing the building of large quantities of similar units, or a singularly large complex. (U.S.D.P.)

**DWELLING DENSITY.** The number of dwellings, dwelling units, people or families per unit hectare. Gross density is the density of an overall area (ex. including lots, streets). Net density is the density of selected, discrete portions of an area (ex. including only lots). (U.S.D.P.)

**DWELLING DEVELOPER.** Three sectors are considered in the supply of dwellings: *POPULAR SECTOR*: the marginal sector with limited or no access to the formal financial, administrative, legal, technical institutions involved in the provision of dwellings. The housing process (promotion, financing, construction, operation) is carried out by the Popular Sector generally for 'self use' and sometimes for profit. *PUBLIC SEC-*

**TOR:** the government or non-profit organizations involved in the provision of dwellings. The housing process (promotion, financing, construction, operation) is carried out by the Public Sector for service (non-profit or subsidized housing). **PRIVATE SECTOR:** the individuals, groups or societies, who have access to the formal financial, administrative, legal, technical institutions in the provision of dwellings. The housing process (promotion, financing, construction, operation) is carried out by the Private Sector for profit. (U.S.D.P.)

**DWELLING DEVELOPMENT MODE.** Two modes are considered: **PROGRESSIVE:** the construction of the dwelling and the development of the local infrastructure to modern standards by stages, often starting with provisional structures and underdeveloped land. This essentially traditional procedure is generally practiced by squatters with de facto security of tenure and an adequate building site. **INSTANT:** the formal development procedure in which all structures and services are completed before occupation. (U.S.D.P.)

**DWELLING FLOORS.** The following numbers are considered: **ONE:** single story; generally associated with detached, semi-detached and row/group dwelling types. **TWO:** double story; generally associated with detached, semi-detached and row/group dwelling types. **THREE OR MORE:** generally associated with walk-up and high-rise dwelling types. (U.S.D.P.)

**DWELLING GROUP.** The context of the dwelling in its immediate surroundings. (U.S.D.P.)

**DWELLING/LAND SYSTEM.** A distinct dwelling environment/housing situation characterized by its users as well as by its physical environment. (U.S.D.P.)

**DWELLING LOCATION.** Three sectors are considered in single or multi-center urban areas. Sectors are identified by position as well as by the density of buildings as follows: **CENTER:** the area recognized as the business center of the city, generally the most densely built-up sector; **INNER RING:** the area located between the city center and the urban periphery, generally a densely built-up sector; **PERIPHERY:** the area located between the inner ring and the rural areas, generally a scatteredly built-up sector. (U.S.D.P.)

**DWELLING PHYSICAL STATE.** A qualitative evaluation of the physical condition of the dwelling types: room, apartment, house; the shanty unit is not evaluated. **BAD:** generally poor state of structural stability, weather protection, and maintenance. **FAIR:** generally acceptable state of structural stability, weather protection, and maintenance with some deviation. **GOOD:** generally acceptable state of structural stability, weather protection, and maintenance without deviation. (U.S.D.P.)

**DWELLING TYPE.** The physical arrangement of the dwelling unit: **DETACHED:** individual dwelling unit, separated from others. **SEMI-DETACHED:** two dwelling units sharing a common wall (duplex). **ROW/GROUPED:** dwelling units grouped together linearly or in clusters. **WALK-UP:** dwelling units grouped in two to five stories with stairs for vertical circulation. **HIGH-RISE:** dwelling units grouped in five or more stories with stairs and lifts for vertical circulation. (U.S.D.P.)

**DWELLING UNIT.** A self-contained unit in a dwelling for an individual, a family, or a group. (U.S.D.P.)

**DWELLING UNIT AREA.** The dwelling unit area (m<sup>2</sup>) is the built-up, covered area of a dwelling unit. (U.S.D.P.)

**DWELLING UNIT COST.** The initial amount of money paid for the dwelling unit or the present monetary equivalent for replacing the dwelling unit. (U.S.D.P.)

**DWELLING UNIT TYPE.** Four types of dwelling units are considered: **ROOM:** A SINGLE SPACE usually bounded by

partitions and specifically used for living; for example, a living room, a dining room, a bedroom, but not a bath/toilet, kitchen, laundry, or storage room. **SEVERAL ROOM UNITS** are contained in a building/shelter and share the use of the parcel of land on which they are built (open spaces) as well as common facilities (circulation, toilets, kitchens). **APARTMENT:** A MULTIPLE SPACE (room/set of rooms with bath, kitchen, etc.) **SEVERAL APARTMENT UNITS** are contained in a building and share the use of the parcel of land on which they are built (open spaces) as well as some common facilities (circulation). **HOUSE:** A MULTIPLE SPACE (room/set of rooms with or without bath, kitchen, etc.) **ONE HOUSE UNIT** is contained in a building/shelter and has the private use of the parcel of land on which it is built (open spaces) as well as the facilities available. **SHANTY:** A SINGLE OR MULTIPLE SPACE (small, crudely built). **ONE SHANTY UNIT** is contained in a shelter and shares with other shanties the use of the parcel of land on which they are built (open spaces). (U.S.D.P.)

**DWELLING UTILIZATION.** The utilization indicates the type of use with respect to the number of inhabitants/families. **SINGLE:** an individual or family inhabiting a dwelling. **MULTIPLE:** a group of individuals or families inhabiting a dwelling. (U.S.D.P.)

**EASEMENT.** Servitude: a right in respect of an object (as land owned by one person) in virtue of which the object (land) is subject to a specified use or enjoyment by another person or for the benefit of another thing. (Merriam-Webster, 1971)

**EFFICIENCY.** Capacity to produce desired results with a minimum expenditure of energy, time, money or materials. (Merriam-Webster, 1971)

**EFFLUENT.** Outflow or discharge from a sewer or sewage treatment equipment. (DePina, 1972)

**ELECTRIC FEEDER.** That part of the electric distribution system between the transformer and the service drop or drops. (HUD, Mobile Court Guide, 1970)

**ELECTRIC SERVICE DROP.** That part of the electric distribution system from a feeder to the user's service equipment serving one or more lots. (HUD, Mobile Court Guide, 1970)

**ELECTRIC TRANSFORMER.** A device which changes the magnitude of alternating voltages and currents; generally from distribution voltages to user voltages; a distribution component that converts power to usable voltage. (TM 5 765 US Army, 1970; U.S.D.P.)

**ELECTRICAL CIRCUIT.** A closed, complete electrical path with various connected loads. Circuits may either be 'parallel' (voltage constant for all connected loads) or 'series' (voltage divided among connected loads). Parallel circuits are fixtures wired independent of each other, which are used in nearly all building wiring. (U.S.D.P.; ROTC ST 45-7, 1953)

**ELECTRICAL FREQUENCY.** The number of times an alternating electric current changes direction in a given period of time. Measured in cycles per second: hertz. (ROTC ST 45-7, 1953)

**ELECTRIC GROUND.** The electrical connection with the earth or other ground. (Merriam-Webster, 1971)

**ELECTRICAL NETWORK COMPONENTS.** It is composed of the following: **GENERATION:** produces electricity; **TRANSMISSION:** transports energy to user groups; **DISTRIBUTION STATION:** divides power among main user groups; **SUBSTATION:** manipulates power into useful energy levels for consumption; **DISTRIBUTION NETWORKS:** provides electric service to user. (U.S.D.P.)

**ELECTRIC PHASE.** May be either a single-phase circuit (for small electrical devices) or a three-phase circuit (for heavy equipment, large electrical devices). In single-phase only one current is flowing through

the circuit with the voltage dropping to zero twice in each cycle. In three-phase currents flow through the circuit with the power never dropping to zero. (U.S.D.P.)

**ELECTRICAL POWER.** The source or means of supplying energy for use; measured in watts. (U.S.D.P.)

**ELECTRICAL WIRING SYSTEMS.** May either be single-phase or three-phase. **SINGLE-PHASE:** 2 hot wires with 1 neutral wire; **THREE-PHASE:** 3 hot wires with 1 neutral wire. (ROTC ST 45-7, 1953)

**ELECTRICITY.** Electrification: the process (network) for supplying (the site) with electric power. (Merriam-Webster, 1971)

**EMBANKMENT (or FILL).** A bank of earth, rock, or other material constructed above the natural ground surface. (DePina, 1972)

**EROSION.** The general process whereby materials of the earth's crust are worn away and removed by natural agencies including weathering, solution, corrosion, and transportation; (specific) land destruction and simultaneous removal of particles (as of soil) by running water, waves and currents, moving ice, or wind. (Merriam-Webster, 1971)

**EXCRETA.** Waste matter eliminated from the body. (U.S.D.P.)

**EXISTING STRUCTURE.** Something constructed or built (on the site). (U.S.D.P.)

**EXPLORATORY BORING.** Initial subsurface investigations (borings) are done on a grid superimposed on the areas of interest and on areas indicated as limited/restricted/hazard in the initial survey. (U.S.D.P.)

**EXTERIOR CIRCULATION/ACCESSES (SITE PLANNING).** The existing and proposed circulation system/accesses outside but affecting the site. These include limited access highways as well as meshing access to the surrounding area. Exterior circulation/accesses are generally given conditions. (U.S.D.P.)

**FAUCET (also TAP).** A fixture for drawing liquid from a pipe, cask, or other vessel. (Merriam-Webster, 1971)

**FINANCING.** The process of raising or providing funds. **SELF FINANCED:** provided by own funds; **PRIVATE/PUBLIC FINANCED:** provided by loan; **PUBLIC SUBSIDIZED:** provided by grant or aid. (U.S.D.P.)

**FIRE/EXPLOSION HAZARDS.** Danger: the state of being exposed to harm; liable to injury, pain, or loss from fire/explosion (at or near the site). (Merriam-Webster, 1971)

**FIRE FLOW.** The quantity (in time) of water available for fire-protection purposes in excess of that required for other purposes. (Merriam-Webster, 1971)

**FIRE HYDRANT.** A water tap to which fire hoses are connected in order to smother fires. (U.S.D.P.)

**FIRE PROTECTION.** Measures and practices for preventing or reducing injury and loss of life or property by fire. (Merriam-Webster, 1971)

**FLEXIBLE PAVEMENT.** A pavement structure which maintains intimate contact with and distributes loads to the subgrade and depends upon aggregate interlock, particle friction, and cohesion for stability. (DePina, 1972)

**FLOODING.** A rising and overflowing of a body of water that covers land not usually under water. (U.S.D.P.)

**FLOODWAY FRINGE.** The floodplain area landward of the natural floodway which would be inundated by low velocity flood waters. (U.S.D.P.)

**FLOW METER.** A device to measure flow of water. (U.S.D.P.)

**FLUSH TANK TOILET.** Toilet with storage tank of water used for flushing bowl. (U.S.D.P.)

**FLUSH VALVE TOILET.** Toilet with self-closing valve which supplies water directly from pipe. It requires adequate pressure for proper functioning. (U.S.D.P.)

**FOOT CANDLE.** A unit of illumination on a surface that is everywhere one foot from a uniform point source of light of one candle and equal to one lumen per square foot. (Merriam-Webster, 1971)

**FUMES.** Gaseous emissions that are usually odorous and sometimes noxious. (Merriam-Webster, 1971)

**GAS.** A system for supplying natural gas, manufactured gas, or liquefied petroleum gas to the site and individual users. (U.S.D.P.)

**GRADE.** Profile of the center of a roadway, or the invert of a culvert or sewer. (DePina, 1972)

**GRID BLOCKS.** The block determined by a convenient public circulation and not by dimensions of lots. In grid blocks some lots have indirect access to public streets. (U.S.D.P.)

**GRIDIRON BLOCKS.** The blocks determined by the dimensions of the lots. In gridiron blocks all the lots have direct access to public streets. (U.S.D.P.)

**GRID LAYOUTS.** The urban layouts with grid blocks. (U.S.D.P.)

**GRIDIRON LAYOUTS.** The urban layouts with gridiron blocks. (U.S.D.P.)

**GOVERNMENT/MUNICIPAL REGULATIONS.** In urban areas, the development of the physical environment is a process usually controlled by a government/municipality through all or some of the following regulations: Master Plan, Zoning Ordinance, Subdivision Regulations, Building Code. (U.S.D.P.)

**HEAD.** (Static). The height of water above any plane or point of reference. Head in feet = (lb/sq. in. x 144)/(Density in lb/cu. ft.) For water at 68°F. (DePina, 1972)

**HIGH-RISE.** Dwelling units grouped in five or more stories with stairs and lifts for vertical circulation. (U.S.D.P.)

**HOT WIRE.** Wire carrying voltage between itself and a ground. (ROTC ST 45-7, 1953)

**HYDRAULICS.** That branch of science or engineering that deals with water or other fluid in motion. (DePina, 1972)

**ILLEGAL.** That which is contrary to or violating a rule or regulation or something having the force of law. (Merriam-Webster, 1971)

**INCOME.** The amount (measured in money) of gains from capital or labor. The amount of such gain received by a family per year may be used as an indicator of income groups. (U.S.D.P.)

**INCOME GROUPS.** A group of people or families within the same range of incomes. (U.S.D.P.)

**INCREMENT (TAX).** A special tax on the increased value of land, which is due to no labor/expenditure by the owner, but rather to natural causes such as the increase of population, general progress of society, etc. (U.S.D.P.)

**INFRASTRUCTURE.** The underlying foundation or basic framework for utilities and services: streets; sewage, water network; storm drainage; electrical network;

gas network; telephone network, public transportation; police and fire protection; refuse collection, health, schools, playgrounds, parks, open spaces. (U.S.D.P.)

INSULATOR. A material or body that is a poor conductor of electricity, heat, or sound. (Merriam-Webster, 1971)

INTERIOR CIRCULATION NETWORK (SITE PLANNING). The pedestrian/vehicular circulation system inside the site. It should be designed based upon the exterior circulation/accesses and land development requirements. (U.S.D.P.)

INTERVAL. A space of time (or distance) between the recurrences of similar conditions or states. (Merriam-Webster, 1971)

KILOWATT (kw). (1000 watts) A convenient manner of expressing large wattages. Kilowatt hours (kwh) measure the total quantity of energy consumed in a given time. One kwh represents the use of an average of 1 kilowatt of electrical energy for a period of 1 hour. (ROTC ST 45-7, 1953)

LAMPHOLE. A vertical pipe or shaft leading from the surface of the ground to a sewer, for admitting light for purposes of inspection. (U.S.D.P.)

LAND COST. Price: the amount of money given or set as the amount to be given as a consideration for the sale of a specific thing (the site). (Merriam-Webster, 1971)

LAND DEVELOPMENT COSTS. The costs of making raw land ready for development through the provision of utilities, services, accesses, etc. (U.S.D.P.)

LAND LEASE. The renting of land for a term of years for an agreed sum; leases of land may run as long as 99 years. (U.S.D.P.)

LAND-MARKET VALUE. Refers to: 1) the present monetary equivalent to replace the land; 2) the present tax based value of the land; or 3) the present commercial market value of the land. (U.S.D.P.)

LAND OWNERSHIP. The exclusive right of control and possession of a parcel of land. (U.S.D.P.)

LAND SUBDIVISION. The division of the land in blocks, lots and laying out streets. (U.S.D.P.)

LAND TENANCY. The temporary holding or mode of holding a parcel of land of another. (U.S.D.P.)

LAND UTILIZATION. A qualification of the land around a dwelling in relation to user, physical controls and responsibility. *PUBLIC* (streets, walkways, open spaces): user -anyone/unlimited; physical controls -minimum; responsibility -public sector. *SEMI-PUBLIC* (open spaces, playgrounds, schools): user -limited group of people; physical controls -partial or complete; responsibility -public sector and user. *PRIVATE* (dwellings, lots): user -owner or tenant or squatter; physical controls -complete; responsibility -user. *SEMI-PRIVATE* (cluster courts): user -group of owners and/or tenants; physical controls -partial or complete; responsibility -user. (U.S.D.P.)

LAND UTILIZATION: PHYSICAL CONTROLS. The physical/legal means or methods of directing, regulating, and coordinating the use and maintenance of land by the owners/users. (U.S.D.P.)

LAND UTILIZATION: RESPONSIBILITY. The quality/state of being morally/legally responsible for the use and maintenance of land by the owners/users. (U.S.D.P.)

LATERAL SEWER. A collector pipe receiving sewage from building connection only. (U.S.D.P.)

LATRINE. A receptacle (as a pit in the earth or a water closet) for use in defecation and urination, or

a room (as in a barracks or hospital) or enclosure (as in a camp) containing such a receptacle. (Merriam-Webster, 1971)

LAYOUT. The plan or design or arrangement of something that is laid out. (Merriam-Webster, 1971)

LEVELS OF SERVICES. Two levels are considered: *MINIMUM*, are admissible or possible levels below the standard; *STANDARD*, are levels set up and established by authority, custom of general consent, as a model, example or rule for the measure of quantity, weight extent, value or quality. (U.S.D.P.)

LIFT PUMP. A collection system component that forces sewage to a higher elevation to avoid deep pipe networks. (U.S.D.P.)

LOCALITY. A relatively self-contained residential area/community/neighborhood/settlement within an urban area which may contain one or more dwelling/land systems. (U.S.D.P.)

LOCALITY SEGMENT. A 400m x 400m area taken from and representing the residential character and layout of a locality. (U.S.D.P.)

LOCATION. Situation: the way in which something (the site) is placed in relation to its surroundings (the urban context). (Merriam-Webster, 1971)

LOT. A measured parcel of land having fixed boundaries and access to public circulation. (U.S.D.P.)

LOT CLUSTER. A group of lots (owned individually) around a semipublic common court (owned in condominium). (U.S.D.P.)

LOT COVERAGE. The ratio of building area to the total lot area. (U.S.D.P.)

LOT PROPORTION. The ratio of lot width to lot depth. (U.S.D.P.)

LUMINAIRE. In highway lighting, a complete lighting device consisting of a light source, plus a globe, reflector, refractor, housing and such support as is integral with the housing. (DePina, 1972)

MANHOLE. An access hole sized for a man to enter, particularly in sewer and storm drainage pipe systems for cleaning, maintenance and inspection. (U.S.D.P.)

MATRIX (OF BASIC REFERENCE MODELS). A set of models of urban layouts arranged in rows and columns. (U.S.D.P.)

MASTER PLAN. A comprehensive, long range plan intended to guide the growth and development of a city, town or region, expressing official contemplations on the course its transportation, housing and community facilities should take, and making proposals for industrial settlement, commerce, population distribution and other aspects of growth and development. (Abrams, 1972).

MEDIAN BARRIER. A double-faced guard rail in the median or island dividing two adjacent roadways. (DePina, 1972)

MESHING BOUNDARIES. Characterized by continuing, homogeneous land uses or topography, expressed as: *LINES*: property lines, political or municipal divisions, main streets, etc.; *AREAS*: similar residential uses, compatible uses (as parks with residential). (U.S.D.P.)

MICROCLIMATE. The local climate of a given site or habitat varying in size from a tiny crevice to a large land area, but being usually characterized by considerable uniformity of climate. (Merriam-Webster, 1971)

MODE OF TRAVEL. Manner of moving from one place (the

site) to another (other parts of the urban context). (U.S.D.P.)

MODEL (OF URBAN LAYOUT). A representation of an urban residential area illustrating circulation, land utilization, land subdivision, and utility network of a specific layout and lot. (U.S.D.P.)

MUTUAL OWNERSHIP. Private land ownership shared by two or more persons and their heir under mutual agreement. (U.S.D.P.)

NATURAL FEATURES. Prominent objects in or produced by nature. (U.S.D.P.)

NATURAL UNDISTURBED SOIL. Soils that have not been disturbed by artificial process. Although natural, they depend greatly on local conditions, environment, and past geological history of the formations. (U.S.D.P.)

NEIGHBORHOOD. A section lived in by neighbors and having distinguishing characteristics. (U.S.D.P.)

NETWORK EFFICIENCY (LAYOUT EFFICIENCY). The ratio of the length of the network to the area(s) contained within; or tangent to it. (U.S.D.P.)

NEUTRAL WIRE. Wire carrying no voltage between itself and a ground. (ROTC ST 45-7, 1953)

NOISE. Any sound (affecting the site) that is undesired (such as that produced by: traffic, airports, industry, etc.) (Merriam-Webster, 1971)

ODOR. A quality of something that affects the sense of smell. (Merriam-Webster, 1971)

OHMS (electrical). The unit of resistance to the flow of electricity. The higher the number of ohms, the greater the resistance. When resistance is constant, amperage (and wattage) are in direct proportion to voltage. Resistance varies inversely with the cross-sectional area of the wire. Ohms = volts/amperes.  $R = E/I$ . The practical mks unit of electrical resistance that is equal to the resistance of a circuit in which a potential difference of one volt produces a current of one ampere or to the resistance in which one watt of power is dissipated when one ampere flows through it and that is taken as standard in the U.S. (U.S.D.P.; ROTC ST 45-7, 1953; Merriam-Webster, 1971)

OPTIMIZE/OPTIMIZE. To bring to a peak of economic efficiency, specially by the use of precise analytical methods. (Merriam-Webster, 1971)

ORGANIC SOILS. Soils composed mostly of plant material. (U.S.D.P.)

OXIDATION POND (LAGOON). A method of sewage treatment using action of bacteria and algae to digest/decompose wastes. (U.S.D.P.)

PERCENT RENT/MORTGAGE. The fraction of income allocated for dwelling rental or dwelling mortgage payments; expressed as a percentage of total family income. (U.S.D.P.)

PIT PRIVY/LATRINE. A simple hole in the ground, usually hand dug, covered with slab and protective superstructure; for disposal of human excreta. (U.S.D.P.)

PLANNING. The establishment of goals, policies, and procedures for a social or economic unit, i.e. city. (U.S.D.P.)

PLOT/LOT. A measured parcel of land having fixed boundaries and access to public circulation. (U.S.D.P.)

POLICE PROTECTION. Police force: a body of trained men and women entrusted by a government with the maintenance of public peace and order, enforcement of laws, prevention and detection of crime. (Merriam-

Webster, 1971)

POPULATION DENSITY. It is the ratio between the population of a given area and the area. It is expressed in people per hectare. It can be: *GROSS DENSITY*: includes any kind of land utilization, residential, circulation, public facilities, etc. *NET DENSITY*: includes only the residential land and does not include land for other uses. (U.S.D.P.)

POSITION. The point or area in space actually occupied by a physical object (the site). (Merriam-Webster, 1971)

PRIMER. A small introductory book on a specific subject. (U.S.D.P.)

PRIVATE LAND OWNERSHIP. The absolute tenure of land to a person and his heirs without restriction of time. (U.S.D.P.)

PRIVY. A small, often detached building having a bench with one or more round or oval holes through which the user may defecate or urinate (as into a pit or tub) and ordinarily lacking any means of automatic discharge of the matter deposited. (Merriam-Webster, 1971)

PROJECT. A plan undertaken; a specific plan or design. (U.S.D.P.)

PUBLIC CIRCULATION. The circulation network which is owned, controlled, and maintained by public agencies and is accessible to all members of a community. (U.S.D.P.)

PUBLIC FACILITIES. Facilities such as schools, playgrounds, parks, other facilities accessible to all members of a community which are owned, controlled, and maintained by public agencies. (U.S.D.P.)

PUBLIC SERVICES AND COMMUNITY FACILITIES. Includes: public transportation, police protection, fire protection, refuse collection, health, schools, and playgrounds, recreation and open spaces, other community facilities, business, commercial, small industries, markets. (U.S.D.P.)

PUBLIC SYSTEM (general). A system which is owned and operated by a local governmental authority or by an established public utility company which is controlled and regulated by a governmental authority. (HUD/AID, Minimum Standards, 1966)

PUBLIC UTILITIES. Includes: water supply, sanitary sewerage, storm drainage, electricity, street lighting, telephone, circulation networks. (U.S.D.P.)

PUMP. A device or machine that raises, transfers, or compresses fluids or that attenuates gases especially by suction or pressure or both. (Merriam-Webster, 1971)

REFUSE COLLECTION. The service for collection and disposal of all the solid wastes from a community. (U.S.D.P.)

RESERVOIR. Large-scale storage of water; also functions to control fluctuations in supply and pressure. (U.S.D.P.)

RESIDENTIAL AREA. An area containing the basic needs/requirements for daily life activities: housing, education, recreation, shopping, work. (U.S.D.P.)

RESISTANCE. The opposition to electrical flow. (Resistance increases as the length of wires is increased and decreases as the cross-sectional area of wires is increased). (ROTC ST 45-7, 1953)

RIGHT-OF-WAY. A legal right of passage over another person's ground (land), the area or way over which a right-of-way exists such as: a path or thoroughfare which one may lawfully use, the strip of land devoted to or over which is built a public road, the land

- occupied by a railroad, the land used by a public utility. Rights-of-way may be shared (as streets; pedestrians and automobiles) or exclusive (as rapid transit routes; subways, railroads, etc.) (Merriam-Webster, 1971; U.S.D.P.)
- ROADWAY (HIGHWAY). Portion of the highway included between the outside lines of gutter or side ditches, including all slopes, ditches, channels, and appurtenances necessary to proper drainage, protection, and use. (DePina, 1972)
- ROW/GROUPED HOUSING. Dwelling units grouped together linearly or in clusters. (U.S.D.P.)
- RUNOFF. That part of precipitation carried off from the area upon which it falls. (DePina, 1972)
- RUNOFF-RAINFALL RATIO. The percentage (ratio) of stormwater runoff that is not reduced by evaporation, depression storage, surface wetting, and percolation; with increased rainfall duration, runoff-rainfall ratios rise increasing runoff flow. (U.S.D.P.)
- SAND. Loose, distinguishable grains of quartz/feldspar, mica (ranging from 2mm to 0.02mm in diameter). (U.S.D.P.)
- SANITARY SEWERAGE. The system of artificial usually subterranean conduits to carry off sewage composed of: excreta: waste matter eliminated from the human body; domestic wastes: used water from a home/community containing 0.1% total solids; and some industrial wastes, but not water from ground, surface, or storm. (U.S.D.P.)
- SEMI-DETACHED DWELLING. Two dwelling units sharing a common wall (duplex). (U.S.D.P.)
- SEPTIC TANK. A tank in which the organic solid matter of continuously flowing sewage is deposited and retained until it has been disintegrated by anaerobic bacteria. (Merriam-Webster, 1971)
- SERIES CIRCUIT. Fixtures connected in a circuit by a single wire. When one fixture is out, the circuit is broken. Fixtures with different amperages cannot be used efficiently in the same circuit. (ROTC ST 45-7, 1953)
- SETTLEMENT. Occupation by settlers to establish a residence or colony. (U.S.D.P.)
- SEWAGE. The effluent in a sewer network. (U.S.D.P.)
- SEWER. The conduit in a subterranean network used to carry off water and waste matter. (U.S.D.P.)
- SEWER BUILDING CONNECTION. The pipe connecting the dwelling with the sewer network. (U.S.D.P.)
- SEWERAGE. Sewerage system: the system of sewers in a city, town or locality. (Merriam-Webster, 1971)
- SHAPE. Form/configuration of the site surface as defined by its perimeter/boundaries. (U.S.D.P.)
- SHOPPING. (Facilities for) searching for, inspecting, or buying available goods or services. (U.S.D.P.)
- SILT. Loose, unconsolidated sedimentary rock particles (ranging from 0.02mm to 0.002mm in diameter). (U.S.D.P.)
- SITE. Land (that could be) made suitable for building purposes by dividing into lots, laying out streets and providing facilities. (Merriam-Webster, 1971)
- SITE AREAS. Two types are considered: *GROSS AREA*: includes the whole site or the bounded piece of ground. *USABLE AREA*: includes only the portion of the site that can be fully utilized for buildings, streets, playgrounds, recreation facilities, gardens, or other structures. (U.S.D.P.)
- SITE AND SERVICES. The subdivision of urban land and the provision of services for residential use and complementary commercial use. Site and services projects are aimed to improve the housing conditions for the low income groups of the population by providing: a) *SITE*: the access to a piece of land where people can build their own dwellings; b) *SERVICES*: the opportunity of access to employment, utilities, services and community facilities, financing and communications. (U.S.D.P.)
- SIZE. Physical magnitude or extent (of the site), relative or proportionate dimensions (of the site). (Merriam-Webster, 1971)
- SLOPE. Degree or extent of deviation (of the land surface) from the horizontal. (Merriam-Webster, 1971)
- SMOKE. The gaseous products of burning carbonaceous materials made visible by the presence of carbon particles. (Merriam-Webster, 1971)
- SOIL. Soil structure: the arrangement of soil particles in various aggregates differing in shape, size, stability, and degree of adhesion to one another. (Merriam-Webster, 1971)
- SOIL INVESTIGATION. It is the process to find the soil structure and other characteristics. It may include the following stages: initial soil survey, exploratory boring, construction boring. (U.S.D.P.)
- SOIL PIPE. The pipe in a dwelling which carries the pipe discharge from water closets. (U.S.D.P.)
- SOIL SURVEY (INITIAL). An on-site examination of surface soil conditions and reference to a GENERAL SOIL MAP. It is used to reveal obvious limitations/restrictions/hazards for early planning consideration. (U.S.D.P.)
- STACK. The vertical pipe in a dwelling of the soil-, waste-, or vent-pipe systems. (ROTC ST 45-7, 1953)
- STANDARD. 1) Something that is established by authority, custom or general consent as a model or example to be followed. 2) Something that is set up and established by authority as a rule for the measure of quantity, weight, extent, value or quality. (Merriam-Webster, 1971)
- STANDPIPE. A pipe riser with tap used as a source of water for domestic purposes. (HUD/AID, Minimum Standards, 1966)
- STORM DRAINAGE. Storm sewer: a sewer (system) designed to carry water wastes except sewage (exclusively storm water, surface runoff, or street wash). (Merriam-Webster, 1971)
- STREET LIGHTING. Illumination to improve vision at night for security and for the extension of activities. (U.S.D.P.)
- SUBDIVISION REGULATIONS. Regulations governing the development of raw land for residential or other purposes. (Abrams, 1972)
- SUBGRADE. The layer of natural soil or fill (compacted soil) upon which the pavement structure including curbs is constructed. (DePina, 1972)
- SUBMAIN OR BRANCH SEWER. A collector pipe receiving sewage from lateral sewer only. (U.S.D.P.)
- SUBSISTENCE INCOME. The minimum amount of money required for the purchase of food and fuel for an average family to survive. (U.S.D.P.)
- SULLAGE. Drainage or refuse especially from a house, farmyard, or street. (Merriam-Webster, 1971)
- TAP (also FAUCET). A fixture for drawing a liquid from a pipe, cask, or other vessel. (Merriam-Webster, 1971)
- TAX EXEMPTION. A grant by a government of immunity from taxes; (a ten-year tax exemption on new housing in New York stimulated new construction in the 1920's; to ease its housing shortage, Turkey granted a ten-year tax exemption on new buildings). (Abrams, 1966)
- TAX INCENTIVE. Favorable tax treatment to induce the beneficiary to do something he would not otherwise be likely to do. (U.S.D.P.)
- TAX STRUCTURE - TAXATION. The method by which a nation (state, municipality) implements decisions to transfer resources from the private sector to the public sector. (U.S.D.P.)
- TELEPHONE. An electrical voice communication network interconnecting all subscribing individuals and transmitting over wires. (U.S.D.P.)
- TENURE. Two situations of tenure of the dwelling units and/or the lot/land are considered: *LEGAL*: having formal status derived from law; *EXTRALEGAL*: not regulated or sanctioned by law. Four types of tenure are considered: *RENTAL*: where the users pay a fee (daily, weekly, monthly) for the use of the dwelling unit and/or the lot/land; *LEASE*: where the users pay a fee for long-term use (generally for a year) for a dwelling unit and/or the lot/land from the owner (an individual, a public agency, or a private organization); *OWNERSHIP*: where the users hold in freehold the dwelling unit and/or the lot/land which the unit occupies; *EMPLOYER-PROVIDED*: where the users are provided a dwelling unit by an employer in exchange for services, i.e. domestic live-in servant. (U.S.D.P.)
- TITLE. The instrument (as a deed) that constitutes a legally just cause of exclusive possession (of land, dwellings, or both). (Merriam-Webster, 1971)
- TOILET. A fixture for defecation and urination, esp. water closet. (7th Collegiate Webster, 1963)
- TOPOGRAPHY. The configuration of a (land) surface including its relief and the position of its natural and man-made features. (Merriam-Webster, 1971)
- TRANSPORTATION. Means of conveyance or travel from one place (the site) to another (other parts of the urban context). (Merriam-Webster, 1971)
- TRAP. A fitting that provides a water seal to prevent sewer gases and odors being discharged through fixtures. (ROTC ST 45-7, 1953)
- TREATMENT WORKS. Filtration plant, reservoirs, and all other construction required for the treatment of a water supply. (ROTC ST 45-7, 1953)
- UNIT. A determinate quantity adopted as a standard of measurement for other quantities of the same kind. (Merriam-Webster, 1971)
- URBAN TRANSPORTATION. Means of conveyance of passengers or goods from one place to another along ways, routes of circulation in a metropolitan context. (U.S.D.P.)
- URBANIZATION. The quality or state of being or becoming urbanized; to cause to take on urban characteristics. (U.S.D.P.)
- USE TAX. The tax on land aimed primarily at enforcing its use or improvement. (U.S.D.P.)
- USER INCOME GROUPS. Based upon the subsistence (minimum wage) income per year, five income groups are distinguished: *VERY LOW (below subsistence level)*: the income group with no household income available for housing, services, or transportation; *LOW (1 x subsistence level)*: the income group that can afford no or very limited subsidized housing; *MODERATE (3 x subsistence level)*: the income group that can afford limited housing and rent only with government assistance; *HIGH (5 x subsistence level)*: the income group that can afford housing without subsidy, by cash purchase, through mortgage payments, or by rent; *VERY HIGH (10 x subsistence level)*: the income group that represents the most economically mobile sector of the population. (U.S.D.P.)
- USUFRUCT. The right to profit from a parcel of land or control of a parcel of land without becoming the owner or formal leasee; legal possession by decree without charge. (U.S.D.P.)
- UTILITIES. Include: water supply, sanitary sewerage, storm drainage, electricity, street lighting, gas, telephone. (U.S.D.P.)
- UTILITY/SERVICE. The organization and/or infrastructure for meeting the general need (as for water supply, wastewater removal, electricity, etc.) in the public interest. (U.S.D.P.)
- VALVE. A water supply distribution component which interrupts the supply for maintenance purposes. (U.S.D.P.)
- VENT. A pipe opening to the atmosphere, which provides ventilation for a drainage system and prevents trap siphonage or back pressure. (ROTC ST 45-7, 1953)
- VIBRATION. A quivering or trembling motion (such as that produced by: heavy traffic, industry, aircraft, etc. (Merriam-Webster, 1971)
- VIEWES. That which is revealed to the vision or can be seen (from the site). (Merriam-Webster, 1971)
- WALK-UP. Dwelling units grouped in two to five stories with stairs for vertical circulation. (U.S.D.P.)
- WASTE PIPE. A pipe (in a dwelling) which carries water from wash basins, sinks, and similar fixtures. (ROTC ST 45-7, 1953)
- WATER SUPPLY. Source, means, or process of supplying water. (as for a community) usually involving reservoirs, pipelines, and often the watershed from which the water is ultimately drawn. (Merriam-Webster, 1971)
- WATERSHED. The catchment area or drainage basin from which the waters of a stream or stream system are drawn. (Merriam-Webster, 1971)
- WATERWORKS. The whole system of reservoirs, channels, mains, and pumping and purifying equipment by which a water supply is obtained and distributed to consumers. (Merriam-Webster, 1971)
- WATT. Watts (w) measure the power of the flow of energy through a circuit. Wattage is the product of volts times amperes. Both watts and horsepower denote the rate of work being done. 746w = 1hp. (ROTC ST 45-7, 1953)
- ZONING ORDINANCE. The demarcation of a city by ordinance into zones (areas/districts) and the establishment of regulations to govern the use of land and the location, bulk, height, shape, use, population density, and coverage of structures within each zone. (U.S.D.P.)

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## EXPLANATORY NOTE

## QUALITY OF INFORMATION

The quality of information given in drawings, charts, and descriptions has been qualified in the following manner:

- Approximate: when deducted from different and/or not completely reliable sources.
- Accurate: when taken from reliable or actual sources.
- Tentative: when based upon rough estimations of limited sources.

## QUALITY OF SERVICES, FACILITIES AND UTILITIES

- None: when the existence of services, facilities and utilities are unavailable to a locality.
- Limited: when the existence of services, facilities and utilities are available to a locality in a limited manner due to proximity.
- Adequate: when the existence of services, facilities and utilities are available to a locality.

## METRIC SYSTEM EQUIVALENTS

Linear Measures

1 centimeter	=	0.3937 inches
1 meter	= 100 centimeters	= 39.37 inches or 3.28 feet
1 kilometer	= 1,000 meters	= 3,280.83 feet or 0.62137 miles
1 inch	=	2.54 centimeters
1 foot	=	0.3048 meters
1 mile	=	1.60935 kilometers

Square Measures

1 square meter	=	1,550 square inches or 10.7639 square feet
1 hectare	= 10,000 sq. m	= 2.4711 acres
1 square foot	=	0.0929 square meters
1 acre	=	0.4087 hectares

## DOLLAR EQUIVALENTS

All money data has been expressed in terms of the US Dollar. 1 US Dollar = 22.60 Mexican Pesos.